

NETWORK WORLD

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FCC ruling on Tariff 15 fuels furor

By Anita Taff
Senior Correspondent, Washington

WASHINGTON, D.C. — In a highly controversial decision, the Federal Communications Commission has allowed AT&T to move ahead with its proposed Tariff 15 competitive pricing plan while the agency investigates its legality.

Tariff 15 has pitted AT&T against an array of user and vendor opponents. It has also raised questions about the fundamental principles behind the current regulatory structure.

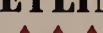
Implementation of Tariff 15 allows AT&T to offer a customer

Tariff 12 plan for American Express draws fire. Page 2.

below-tariff prices if a competing carrier has made such an offer. The tariff has been criticized by users groups, such as the International Communications Association and the Ad Hoc Telecommunications Users Committee, as well as by most of AT&T's competitors.

Opponents question whether it is legal for AT&T, a dominant carrier required to abide by tariffs, to offer discounts on a customer-specific basis. If AT&T is allowed to price service on a case- (continued on page 91)

NETLINE



THE MAP/TOP USERS Group outlines its restructuring plan and its strategy for MAP 3.0 product testing. Page 2.

EUROPE'S PUBLIC carriers prepare to form a joint venture to offer data networking services. Page 4.

NEW SOFTWARE FROM Unisys supports a multitude of communications capabilities. Page 4.

HUGHES GETS ACCESS to Ku-band satellites for its VSAT network offerings. Page 4.

TOP INFINET EXECS GET their walking papers from parent Memotec as the company is brought under Memotec's name. Page 4.

LAN SPEEDS AREN'T everything. Our PC Buyer's Guide tells you what to look for when buying a LAN server. Page 63.

New from IBM

NetView

Release 3 of NetView • OS/2 version of NetView/PC • NetView Distribution Manager • other announcements

OSI and TCP/IP

X.400 software for VM and MVS • X.400 links for Professional Office System and DISOSS • File Transfer, Access and Management software • TCP/IP for MVS • direct host connections for IBM and non-IBM local nets

Local networks

New versions of LAN Manager • bridge software for IBM Token-Ring and PC Networks

Data networking

Stand-alone and rack-mounted modems • new data service unit/channel service unit • ISDN terminal adapter

Net management services

Remote network management service for mixed-vendor environments

Voice networks

New voice-response unit • enhancements to Redwood PBX • Application System/400 Telephony Application Services

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GRAPHIC BY SUSAN J. CHAMPEY

Networks shine in IBM product rollout

Computer firm extends reach of its NetView, NetView/PC packages.

By John Cox
Senior Editor

NEW YORK — IBM last week announced versions of its NetView and NetView/PC network management software that add new functions and make the products easier to use.

The announcements, part of a product barrage here, also improve NetView support for IBM mid-range systems and the IBM Token-Ring Network, according to IBM officials and industry analysts (see "IBM boosts LAN control, adds new bridge software," page 4).

The announcements included Release 3 of NetView, Version 1.2 of NetView/PC, a new version of NetView Distribution Manager and a new method for distributing software to networked IBM Personal Computers and Personal System/2s.

IBM also announced the Transmission Network Manager, a Personal System/2-based net management system for Network Equipment Technologies, Inc. (NET) T-1 multiplexers, and the Matrix Switch Host Facility 2, which offers NetView control for (continued on page 88)

Big Blue offers OSI, TCP/IP tools, adds host links for non-IBM LANs.

By Mary Petrosky
West Coast Bureau Chief

NEW YORK — In a move to strengthen its multivendor connectivity, IBM last week announced plans to deliver OSI-based products in the U.S. by year end and to extend TCP/IP support to the MVS environment.

In addition, IBM announced a product for linking its host computers directly to non-Systems Network Architecture local networks running Transmission Control Protocol/Internet Protocol or Open Systems Interconnection protocols. Big Blue also announced that OSI-compatible (continued on page 91)

Broad brush of OSI leaves room for proprietary nets

Feature-rich, vendor-specific network schemes fill functional gaps in 'all things to all people' OSI.

By Mary Petrosky
West Coast Bureau Chief

IBM's Open Systems Interconnection announcements last week and the adoption of OSI as a federal acquisition standard have given the open network movement a boost, but vendors say users shouldn't expect proprietary nets to disappear soon.

Suppliers of computer and network products cite a litany of shortcomings in the current OSI specifications as the key reason

users will stick with vendor-specific networking schemes for the foreseeable future. OSI specifications are lacking in areas such as network management, transaction processing and internetwork routing, according to vendors.

Another problem with OSI is that so many different implementations are possible, noted Mark Calkins, vice-president of marketing for Novell, Inc.

In trying to create standards (continued on page 95)

Users await new era of global nets

By Barton Crockett
Senior Writer

LONDON — Snowballing deregulation and booming growth in fiber-optic transmission capacity promise to change the face of international networking, said speakers at an international user conference here last week.

Speakers at the two-day World Communications Seminar said deregulation will greatly ease the task of building global networks. In addition, expanding international fiber capacity will support a range of new applications.

The conference was sponsored by three leading users groups: the International Communications Association (ICA), the International Telecommunications Users' Group and the Telecommunications Managers Association of the UK.

At the conference, representatives of national communications authorities outlined efforts to promote competition and loosen regulation in their countries.

Federal Communications Commissioner Patricia Diaz Dennis told attendees, "We are clearly in an era of deregulation (continued on page 96)

FEATURE

Minicomputer makers spruce up LAN offerings

Accepting micros as departmental partners, vendors transform minis into PC LAN servers.

By Jeffrey Horn
Special to Network World

Minicomputer vendors have traditionally viewed personal computer local-area networks as intruders in departmental processing. Now, however, some of these same vendors are renovating the communications market with integrated minicomputer/microcomputer networking systems.

Aiming to offer users the best of both worlds, vendors are blending the familiar features

of DOS interfaces with minicomputer operating system functionality and power.

Today's integration products go far beyond terminal emulation, and microcomputer-to-mainframe connections will have to play catch-up with the latest microcomputer-to-minicomputer capabilities.

Minicomputer vendors are trying two quite different strategies for dealing with the upstart microcomputer: bringing the (continued on page 57)

MAP/TOP group details reorganization, test plans

Newly formed steering committee will take reins of group from General Motors on Jan. 1.

By Bob Wallace
Senior Editor

CHICAGO — The North American MAP/TOP Users Group detailed the restructuring of the 700-company association and discussed MAP 3.0 product testing and availability at its fall meeting here last week.

Meeting for the first time since the Enterprise Networking Event (ENE) '88 International in Baltimore in June — the largest ever Open Systems Interconnection networking demonstration — the users group focused on broadening the scope of the movement.

As part of the restructuring plan, General Motors Co. will turn over command of the 4-year-old program to the Information Technology Requirements Council (ITRC), a newly formed non-profit organization that will provide long-term policy guidance, permanent staff support and stable funding for the users group.

The ITRC, based in Ann Arbor, Mich., will also publish and maintain the Manufacturing Automation Protocol and Technical and Office Protocol specifications. The group will operate as a division of ITRC as of Jan. 1, 1989.

Officials said the reorganized group hopes to broaden its user

base and rely on dues for funding. A handful of members, including GM, Boeing Computer Services Co. and Eastman-Kodak Co., now provide most of the money and resources for the group.

"For MAP and TOP to be successful, they have to be perceived as a total user consensus," said Charles Gardner, chairman of the group's steering committee. "The world has to believe that this is not a product of two companies, but rather a product of all users group members."

MAP/TOP's main goal will remain unchanged, Gardner said. "The mission is to provide a user-driven coalition with vendors and the government to continue to accelerate the usage and development of MAP-compliant products," he said.

Representatives of GM, Boeing Computer Services, Eastman-Kodak, Apple Computer, Inc., Hewlett-Packard Co., Bechtel Group, Inc., the Industrial Technology Institute and the Canadian Standards Association will serve on the ITRC board of directors. Gardner said the board will expand to include new members.

"We hope to have 20 board members by the end of next year," he said. Companies with

(continued on page 93)

Opponents decry Tariff 12 net for American Express

Rivals, vendors ask FCC to reject AT&T's tariff.

By Anita Taff
Senior Correspondent, Washington

WASHINGTON, D.C. — The controversy surrounding AT&T's Tariff 12 custom networks expanded last week as four companies, including AT&T's top long-distance rivals, protested a special serving arrangement offered to American Express Co.

With Tariff 12 filings, AT&T can offer custom-designed networks incorporating a mix of voice and data services at a fixed price for large business users. In the Tariff 12 packages already proposed by AT&T, users receive significant discounts from tariffed rates.

American Express signed a three-year, \$204 million contract with AT&T for a 600-site custom network ("Amex picks Tariff 12 custom net," NW, Sept. 12).

Petitions filed with the Federal Communications Commission last week by MCI Communications Corp., US Sprint Communications Co., the Puerto Rico Telephone Co. and the International Data Communications Manufac-

turers Association, Inc. (IDCMA) raised many of the same concerns expressed about previous Tariff 12 contracts. The petitioners asked the FCC to either reject or suspend and investigate the legality of the offer made to American Express.

Plans under investigation

Previous Tariff 12 plans for General Electric Co., E.I. du Pont de Nemours & Co. and Ford Motor Co. are currently under investigation by the FCC. AT&T has been allowed to proceed with these three network offerings; the FCC has not reached a final decision regarding the legality of the service plans.

AT&T has claimed that Tariff 12 allows it to serve an individual user's needs. But critics, including the four organizations that petitioned the FCC, say the networks offer no unique services and allow AT&T to use off-tariff pricing to lock in its largest business customers. They said the networks are unlawful because they provide unfair cost benefits

(continued on page 96)

Briefs

Centrex link under development.

Northern Telecom, Inc. said last week that it is working with IBM to develop software that will enable Centrex customers to use their IBM mainframes to download call-detail reports from Northern Telecom DMS-100 central office switches. To support the project, Northern Telecom is enhancing its Business Network Management software, which resides on its Dynamic Network Controller, to support IBM's Advanced Program-to-Program LU 6.2 protocols and IBM's Distributed Data Management protocol. The software will be developed and tested over the next five months.

MCI accounts and discounts. MCI Communications Corp. last week expanded its Corporate Account Service (CAS) call-accounting plan to include monthly reports on all outbound MCI long-distance services, rather than selected services as before. The company also released a new plan, CAS Plus, that offers discounts on MCI service, such as the MCI Card and Prism Plus, to multiple-location users who spend more than \$50,000 a month on long-haul services. MCI also announced an average 3.7% price cut for its Vnet virtual net service and changed the basic Vnet package to include more services at the same price.

COS Mark seals in compatibility. The Corporation for Open Systems (COS) will open its first conformance test center at its McLean, Va., headquarters this week. The center will be the site for a pilot COS Mark program through which COS will certify that vendors' equipment complies with

Open Systems Interconnection standards. Rodney Sandel, vice-president of sales and marketing for COS, said IBM and Hewlett-Packard Co. have expressed interest in becoming test vendors.

ICA fights on over special access. The International Communications Association is continuing its court battle to try to get the Federal Communications Commission to reach a decision on the legality of regional Bell holding companies' strategic pricing of special access charges. Last week, the association filed its last legal brief urging the U.S. Court of Appeals to force the FCC to make a decision on the 3-year-old proceeding. Earlier this month, the FCC told the appeals court it would take up the pricing issue in October. RBHC special access tariffs apply to the local portion of long-distance private-line services and can make up 50% of the cost of long-distance service.

New game in South Korea. A few months after the Olympics wrap up in Seoul, South Korea, the country will install a \$10 million public high-speed digital network, Timeplex, Inc. said last week. The Data Communications Corp. of Korea (Dacom), a joint venture between the Korean Telecommunications Authority and a number of private industries, will install a digital backbone T-1 network from Timeplex. The network, which will be developed over five years, will come on line in five cities by November and will grow to connect about 200 nodes in 15 regional centers. Dacom will offer data services via the net to customers in industries such as airlines, banking and publishing.

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MCI and US Sprint are gradually taking a larger chunk out of AT&T's long-haul market share.

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NetWorld 88 braces for its largest show ever.

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Management Strategies

Senior executives surveyed at U.S. firms confirm that information systems and networking can provide a strategic edge.

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Products & Services

Product introductions are expected to abound at this year's TCA show. Debuts expected include multiplexers from Rad Data and a network management system from NEC America.

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Asking the right questions can keep a net manager out of risk when installing a T-1 network.

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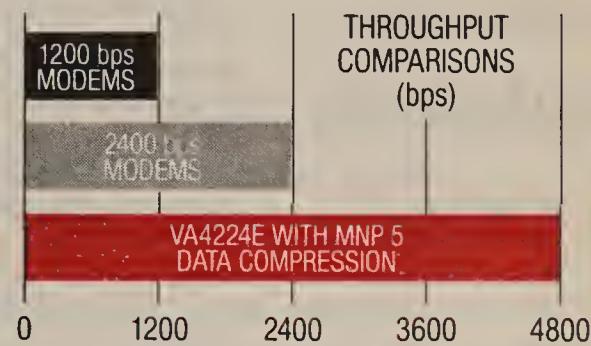
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IBM boosts LAN control, adds new bridge software

New versions of LAN Manager let PC Network and Token-Ring communicate with NetView.

By Laura DiDio
Senior Editor

NEW YORK — Included in IBM's network management announcements here last week were two new versions of its LAN Manager, which for the first time allow users of IBM Token-Ring or PC Networks to send alerts and receive commands directly from a NetView host.

Additional IBM product coverage begins on page 93.

IBM also introduced a new PC Network Bridge Program that can be used to link individual segments of broadband PC Networks or Token-Ring Networks into one logical local network.

Industry analysts and consultants said the latest versions of the IBM LAN Manager fill an important gap in IBM's network

management strategy.

"If you look at a matrix of the IBM PC LAN marketplace as to what products are there and what's not, you find some holes. And the biggest gap they had to fill was to supply their customers with an integrated network management system: one central site where all alarms and alerts are reported," said Frank Dzubeck, president of consulting firm Communications Network Architects, Inc. in Washington, D.C.

LAN Manager

The IBM LAN Manager — not to be confused with the LAN Manager operating system being jointly developed by 3Com Corp. and Microsoft Corp. — is a network management software tool that aids users in identifying and fixing local network problems.

The LAN Manager includes

two versions. Version 1.0 is an entry-level network management program that allows single-segment IBM Token-Ring or broadband PC Networks to be managed by the new NetView Release 3 (see "Networks shine in IBM product rollout," page 1).

Version 1.0, however, runs only as an agent of NetView; there is no local interface for an operator. All commands must be entered from a central NetView console, according to Linda Cohen, a senior IBM product administrator in the marketing and service communications systems group.

Version 2.0 gives users the option of managing their IBM local nets centrally from a NetView host, locally from a LAN Manager station or from both points.

"Version 1.0 Entry Level LAN Manager was specifically designed to manage multiple small local networks from a single NetView site. Version 2.0 was designed for large corporate LANs that are most likely bridged," Cohen explained.

Implementing Command Lists (CLIST), Version 2.0 accesses a number of management functions (continued on page 98)

Unisys OS boosts net capabilities

By Jim Brown
New Products Editor

NEW YORK — Unisys Corp. last week introduced a new operating system that provides a broad range of communications capabilities for its mainframes.

The System Base 3 (SB3), an enhanced version of Unisys' existing OS 1100 operating system, was announced here along with 11 new models of the Unisys 2200/600 mainframes. SB3 runs

on the new mainframes as well as the existing range of Unisys 1100 and 2200 mainframes.

SB3 lets applications running on various Unisys mainframes share a common data base, and it supports a range of new software, also announced last week.

The new software supports transaction-processing applications, which are used in such things as airline reservation systems. Other packages enable Unisys mainframes to support International Standards Organization (ISO) Open Systems Interconnection communications protocols and establish communications links between Unisys mainframes and other systems.

Both SB3 and the transaction-processing software announced

last week form the basis of Unisys' Extended Transaction Processing Architecture (XTPA), which distributes transaction-processing chores across a series of Unisys 1100/90 and 2200/600 systems.

SB3 will support existing applications currently running on 1100 or 2200 systems, which are former Sperry Corp. machines. SB3 will not run on the former Burroughs Corp. A Series mainframes, which are also sold by Unisys. Unisys was formed by the merger of Sperry and Burroughs.

The OSI-compatible software Unisys unveiled last week links Unisys 1100 and 2200 hosts to other vendors' systems running OSI-compatible software.

(continued on page 90)

Memotec cuts top staff at Infinet unit, consolidates

By Paul Desmond
Staff Writer

NORTH ANDOVER, Mass. — Memotec Data, Inc. took dramatic corrective actions at its Infinet, Inc. subsidiary recently, firing most of its top executives and then announcing the consolidation of the two company's operations under a single name.

Infinet, based here, has suffered sluggish sales of its modem, multiplexer and network management products. On Sept. 16, parent company Memotec fired 17 top executives of the firm — including President and Chief Executive Officer Nicholas Papantonis. The firm last week announced the two companies had been consolidated under the Memotec name.

Memotec's Richard Nehme, manager of marketing and corporate affairs, confirmed that Papantonis and others had been let go, but he would not confirm the exact number of layoffs. "The number is not important," he said. "What's important is to realize that the company has refocused its efforts in the data communications field to capture opportunities ahead and be a major player in this business."

A source close to Infinet who requested anonymity said William McKenzie, Memotec's president and chief executive officer, came here unannounced from the company's Montreal headquarters on Sept. 16. After asking Papantonis to clear out his office, the source said, McKenzie and

other Memotec officials fired about 16 executives from virtually all departments.

Further cuts in the sales and engineering staff were made last week, the source said. Nehme would not confirm or deny those layoffs, nor would he comment about the manner in which the executives were dismissed.

The layoffs and merger come in the wake of similar actions at other data communications equipment companies. Codex Corp. laid off 280 employees in July ("Struggling Codex trims work force," NW, July 25), and General DataComm, Inc. cut its work force by about 5% late last year.

Industry analysts were not surprised by the move. Some said it was necessary because of the lean market for some types of data communications equipment. "There's a lot of companies that could use this in the data (continued on page 90)

European public carriers form net services outfit

By Barton Crockett
Senior Writer

LONDON — Twenty-two of Europe's public carriers are banding together to form a network services company that some observers fear could wield too much power.

The joint company, dubbed Managed Data Network Services (MDNS), will be incorporated in the Netherlands, although the participants have yet to pick a city for its headquarters.

Essentially, the company would play the role of systems and services integrator, designing and implementing Pan-European networks for users.

In a prepared statement, MDNS officials said the company will provide "one-stop shopping for data communications." The company, the statement said, will sell network access and interfacing facilities, gateway services and network management services using the carriers' public switched networks or leased circuits.

Both UK carriers — British Telecommunications plc and Mercury Communications Ltd. — will participate in MDNS, as will the public carriers of France, West Germany, Italy, Sweden, the Netherlands, Spain, Belgium and

Finland, among others.

Some observers claimed that MDNS could crush existing firms that provide these services.

"Collectively, they control and regulate nearly all of the public communications facilities in Europe," said Pliny Porter, managing director for Associated International Information & Technology Ltd., a consulting firm based in Ewell-Surrey, UK. "They control the facilities and the rules. There's no way anybody could compete with them."

Porter argued that this company could be detrimental to users in the end.

"They could achieve a monopoly position and then begin pricing their services like monopolists," he said. "This whole thing could be a ploy to regain the monopoly power they are losing as a result of deregulation in Europe."

Porter's contentions of possible abuses by the group were dismissed, however, by Jorgen Richter, head of the Telecommunications Directorate of the Commission of European Countries.

"We have been working with them very closely, and I can assure you that nothing bad will (continued on page 98)

Hughes Communications buys into IBM satellites

Acquires transponder space with investment.

By Bob Brown
Senior Writer

ARMONK, N.Y. — Hughes Communications, Inc. last week boosted its presence in the very small aperture terminal networking market by agreeing to buy a minority interest in an IBM subsidiary that owns three satellites.

The agreement gives Hughes Communications, a subsidiary of Hughes Aircraft Co., the right to market transponder space on three Ku-band satellites owned and operated by Satellite Transponder Leasing Corp. (STLC), a wholly owned IBM subsidiary based in McLean, Va. STLC will retain ownership of the satellites.

The investment will make it easier for Hughes Communications to offer users dedicated and shared-hub VSAT networks. While Ku-band transponder space is plentiful, according to analysts, Hughes Communications will not have to worry about negotiating for such space, as it has in the past. The company will continue to lease the transponder space it is currently using, but it will not have to lease transponder space in the future.

Financial terms of the agreement, which is expected to be

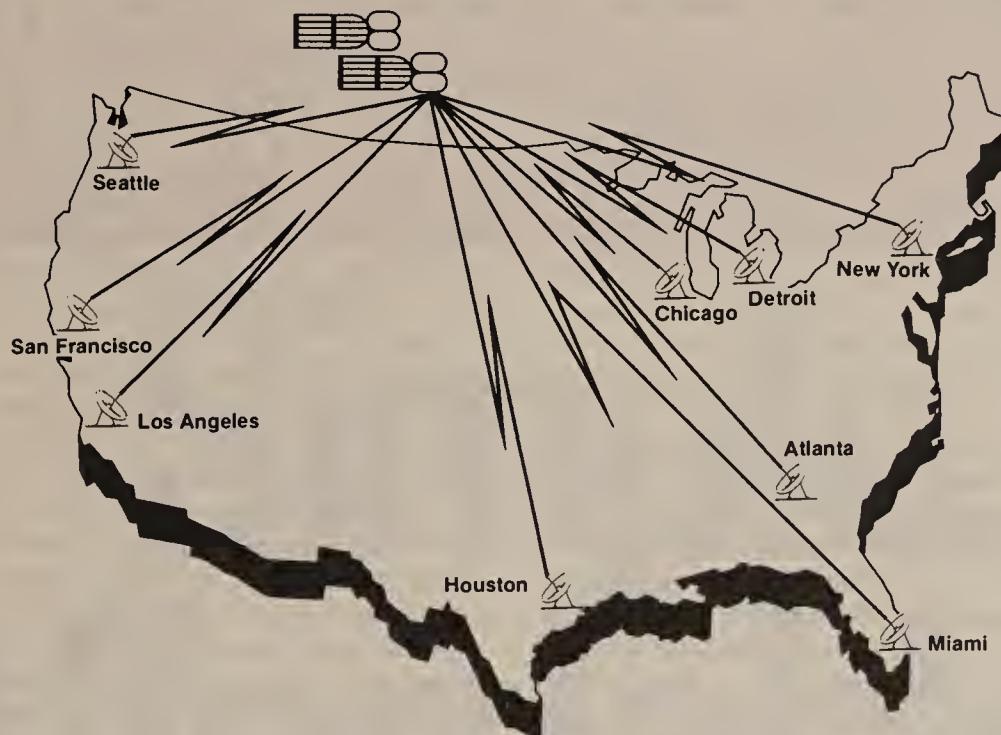
concluded within the next two months, were not disclosed. But the combined asset value of the three STLC Ku-band satellites — SBS-4, SBS-5 and SBS-6 — is more than \$250 million.

IBM acquired its three SBS satellites through its participation in a venture called Satellite Business Systems, which failed to make much headway in the satellite business. IBM sold its percentage of Satellite Business Systems, as well as three other SBS satellites, to MCI Communications Corp. in a 1986 deal that eventually gave IBM partial ownership in the long-haul company. IBM recently sold back much of the interest it acquired in MCI.

The STLC deal marks Hughes Communications' first investment in Ku-band satellites. Currently, STLC is the only company from which Hughes leases Ku-band transponder space.

The deal will allow Hughes Communications to control the use of SBS-4, which already supports customers; SBS-5, which was launched Sept. 8 and is scheduled to support customers; and SBS-6, a higher power satellite still under construction and (continued on page 98)

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COS and SPAG join forces in OSI test effort

BRUSSELS, Belgium — At a recent meeting here, the Standards Promotion and Applications Group (SPAG) and the Corporation for Open Systems (COS) announced plans to combine their Open Systems Interconnection conformance-testing products into a single tool set.

COS said the move will save \$6 million in development costs and shave several years off the time needed to provide a full set of testing tools. The integrated tool set is expected to be available by March 1989.

SPAG and COS also entered into a marketing agreement through which SPAG will market the two groups' conformance testers in Europe, and COS will market them in North and South America.

COS and SPAG will jointly select a third party to distribute the conformance tests in Japan and Australia.

Although COS officials declined to specify the financial details of the agreement, Rodney Sandel, vice-president of sales and marketing at COS, said each of the organizations will receive royalties for the sale of its products.

He added that each group will be free to price the conformance test product independently.

The groups, which represent major computer vendors in the U.S. and Europe,

said they will also license each other to do third-party testing with each other's tools.

The announcements came during the first joint meeting of the two groups' boards of directors.

Headquartered in McLean, Va., COS is a nonprofit group chartered to develop tools for testing product conformance with international standards. SPAG, based here, has undertaken a similar mission.

Wim Roelandts, vice-president and general manager of Hewlett-Packard Co.'s Networked Systems Group, called the agreement "a very, very important milestone."

He said international users would benefit from a unified set of testing products that would ensure that U.S. and European computer products implement OSI and Manufacturing Automation Protocol/Technical and Office Protocol similarly.

"From a vendor point of view," he added, "we were afraid we would have to do two different products — one for the U.S. and one for Europe."

Not necessarily interoperability

Industry officials cautioned, however, that the testing will certify standards conformance, not product interoperability. In theory, consistent industrywide implementation of OSI and MAP/TOP should ensure the interoperability of heterogeneous networks of computer systems; however, fine-tuning probably would be required to enable different vendors' products to interconnect seamlessly.

"No one could ever guarantee that if you conform with the standard, you are in-

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Videotex venture expands service to four additional cities in Calif.

Prodigy interactive offerings to be available in seven cities.

By Wayne Eckerson
Staff Writer

LOS ANGELES — Prodigy Services Co., a joint videotex service venture established four years ago by IBM and Sears, Roebuck and Co., announced last week that it will expand its operations from three to seven cities.

Starting in October, Prodigy will market its videotex services to personal computer users in four new cities, all in California: Los Angeles, San Diego, Sacramento and Santa Barbara. Prodigy began offering videotex services on a trial basis this summer in Hartford, Conn., Atlanta and San Francisco.

Prodigy offers interactive videotex services that enable personal computer users to, among other things, bank, send electronic messages, purchase stock, make travel reservations and shop at home. In addition, it provides users with a variety of information services, including weather, financial information, news and sports.

Several retail stores in the seven cities will sell start-up software kits that allow personal computer users with a modem to access the service.

Participating retailers include Radio Shack, Computerland Corp., Egghead Discount Software, B. Dalton's Software Etc., Electronics Boutique, Sears Business Cen-

ters and Sears retail stores.

Start-up kits have a suggested retail price of \$49.95 and include three months of free service. Prodigy is offering a start-up kit that includes a Hayes Microcomputer Products, Inc. 1200 PBS modem for \$149.95.

Prodigy also announced that a brokerage service offered by Donaldson, Lufkin & Jenrette Securities Corp. will soon be available to subscribers. Users will be charged commissions only for financial transactions.

Prodigy is a major venture in an emerging market that has already witnessed some notable failures. Knight-Ridder Software Co., Times Mirror Videotex Services, Inc. and Centel Corp. all offered videotex services that have since been discontinued. Analysts point to high rates charged by videotex companies as the major reason why consumers have shied away from the services ("Trintex becomes Prodigy, readies videotex service," NW, May 9).

Unlike previous videotex suppliers, however, Prodigy plans to charge users a flat monthly rate instead of a fee based on usage. Prodigy officials said that advertising revenue allows the company to offer flat-rate service. Already, Prodigy has announced the names of 112 advertisers for its on-line service. □

Datapoint positions new LAN software as rival to NetWare

By Laura DiDio
Senior Editor

DALLAS — Datapoint Corp. last week announced a local network operating system it hopes to position as a competitor to Novell, Inc.'s NetWare.

The Datalan personal computer network operating system is compatible with the IBM PC LAN Program and other MS-Net operating systems. It can be used with Ethernet, token ring, Arcnet and other Network Basic I/O System-compatible local networks.

According to Don Bynum, vice-president of worldwide marketing at Datapoint, the company hopes to lure customers away from NetWare based on the facts that Datalan is 30% less expensive, is based on industry standards and can work in conjunction with a variety of other vendors' operating systems and instruction sets.

Novell's operating system is proprietary, Bynum said.

Bynum views the microcomputer local network market as consisting of "server-centric" and "network-centric" types of networks.

The server-centric networks are proprietary, feature a dedicated centralized server and use proprietary protocols. In network-centric products, all the processors on the network are peers. Industry-standard protocols are used, and whatever operating system and instruction set the heterogeneous peers use are supported.

"Datapoint has opted to pursue the second approach," Bynum said. "We've created a network that runs NETBIOS, MS-Net and the MS-DOS or OS/2 file structures. Datalan is fully compliant with all of those

standards but delivers the same performance that Novell's NetWare does."

The Novell NetWare server, Bynum said, "doesn't read or write MS-DOS files — it writes NetWare files. Therefore, users are locked into relying on Novell-only tools, utilities and device drivers."

Pricing

Datapoint offers a fully equipped 20-user network — including software, interface adapters, network hubs, dedicated server software, NETBIOS and read-only memories for diskless workstations — for about \$13,500, Bynum said.

"That's about 30% less than Novell's price," he said. A 50-user system costs approximately \$25,000. The Datapoint Datalan pricing does not include the personal computers.

Datalan network operating system software is also sold as a stand-alone product in three configurations. In a four-user configuration, it is priced at \$595. For up to eight users, the price is \$1,195. Datalan for eight to 255 users costs \$1,995.

In addition to the Datalan network operating system software, the company also introduced an optional dedicated server for IBM and compatible networks. It is a multitasking server, featuring 32M bytes of cache memory and supporting up to 12G bytes of disk. The server software lists for \$2,495.

All of the products are shipping now and are available for immediate delivery.

For further information, contact Datapoint Corp. at 9725 Datapoint Drive, San Antonio, Texas 78224, or call (512) 699-5933. □

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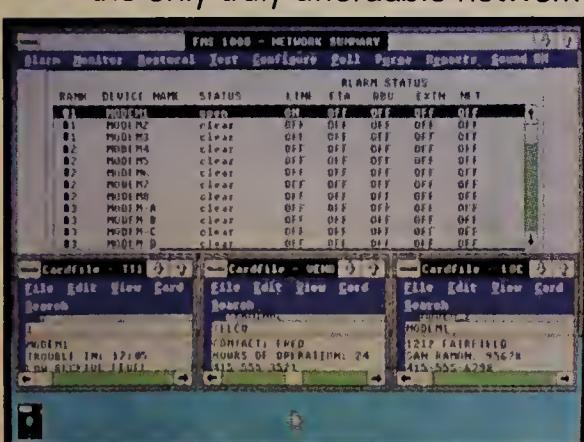
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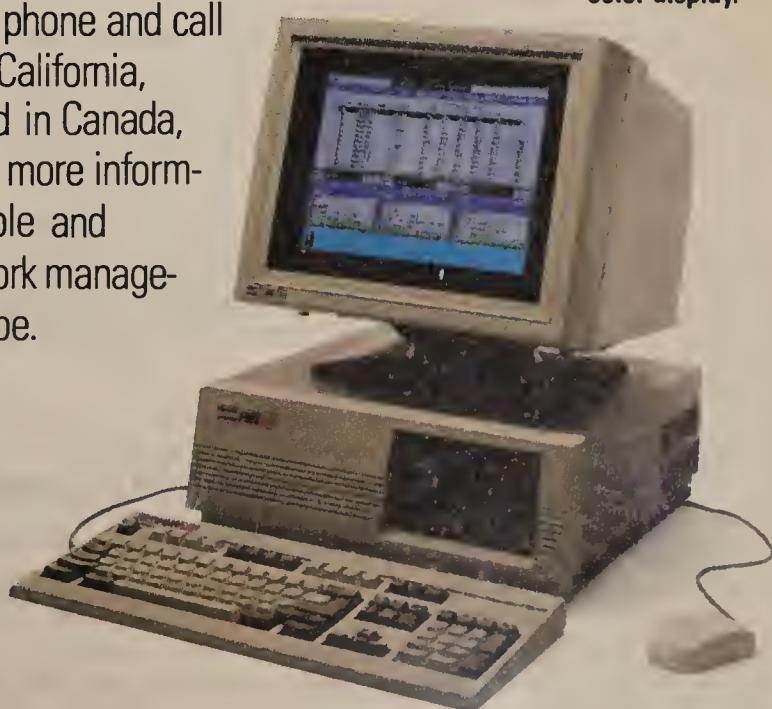


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DEC set to release specifications for integrated document design

Specs enable development of CDA-compliant applications.

By Paul Desmond
Staff Writer

MAYNARD, Mass. — Digital Equipment Corp. said recently it will provide specifications for its Compound Document Architecture (CDA), which defines how documents containing text, graphics and images can be accessed across a DECnet network by users working under disparate operating systems.

DEC will provide software developers with the documentation necessary to design applications that comply with CDA.

CDA defines how documents containing information stored in different forms can be shared and revised by users of workstations running disparate operating systems, including DEC's VAX/VMS and Ultrix, MS-DOS, OS/2 and Apple Computer, Inc.'s Macintosh operating system.

A compound document is defined by DEC as one that contains information from a number of different sources and that may hold text, graphics, spreadsheets, charts, tables, images, application data or — eventually — voice and video.

For example, in a typical business application, the research, finance, marketing and engineering departments of a company may each have information on a common project. Rather than create separate files, data from each department can be combined into one compound document that, under CDA, could be accessed and revised by all users.

Howard Woolf, manager of DEC's Electronic Publishing Systems division, said the architecture also provides "live links" to allow automatic updating of data contained in a compound document when the source of that data is changed. For example, a user could create a weekly report and designate a live link to a spreadsheet. When the report is updated each week, the new information would automatically be entered on the spreadsheet, or the spreadsheet could be designated as the source

with a live link to the weekly report.

In addition, one user could create a document on a workstation capable of producing only text and graphics, then pass it to another user whose workstation can add images. When the original user gets the document back, the image will be there. If that user's workstation cannot display images, an icon will appear signifying where the image resides.

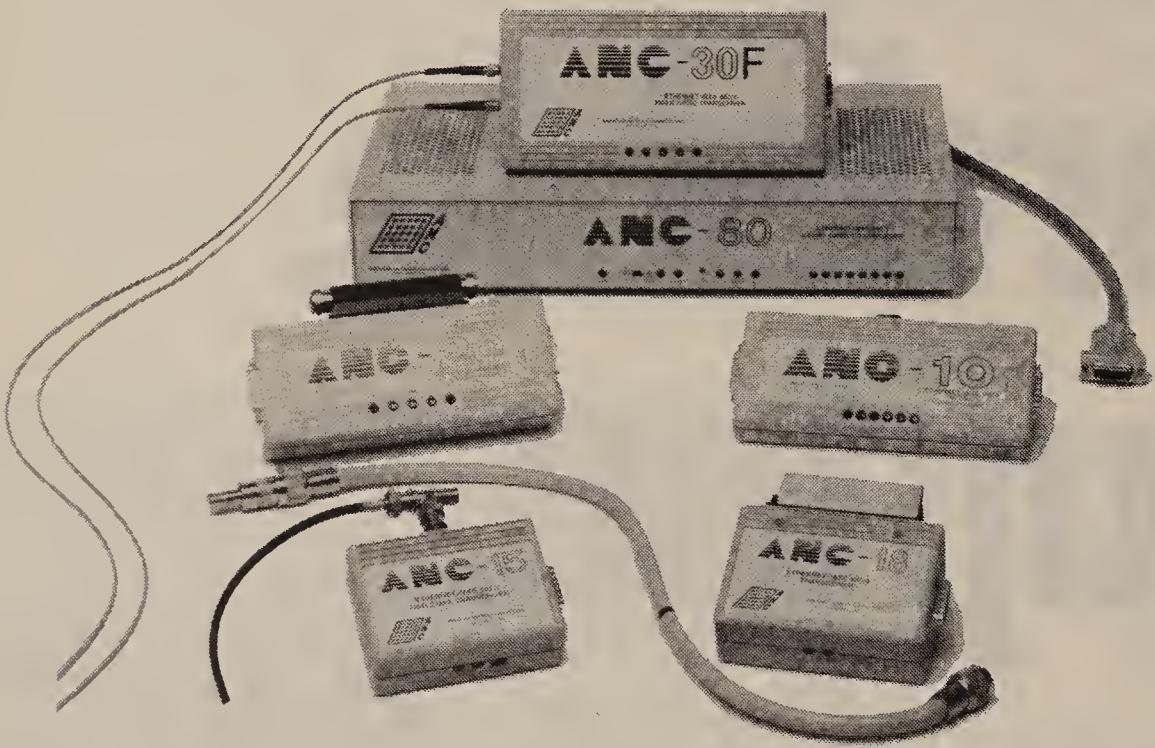
"You can actually add value along the network by passing documents to different users who have more functionally rich tools at their disposal," Woolf said. "You don't have to give everyone the highest set of tools that you might ever use."

DEC has already lined up a myriad of vendors to support CDA. At the Apple-DEC joint developers' conference in August, Apple announced a commitment to develop software to convert its MACpaint, MACwrite and PICT formats into CDA-compatible formats.

The architecture has also been endorsed by other vendors involved in electronic publishing, including Aldus Corp., Datalogics, Inc., Information Dimensions, Inc., Interleaf, Inc. and Eastman Kodak Co. These vendors have been developing CDA-based applications for more than 18 months, Woolf said.

Within the last two weeks, CDA was also endorsed by vendors outside the electronic publishing field. Molecular Design Ltd. and Polygen Corp., developers of software

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ANC-10 AUI-AUI Direct Connection Unit provides a 10 Mbps CSMA/CD direct connection between two Ethernet stations (within 100 meters).

ANC-15 single port Thin Coax Transceiver, with integrated BNC T-connector, allows a quick connection to an Ethernet thin coax segment, replacing the DEC DESTA™ ThinWire™ Ethernet station adaptor.

ANC-18 single-port Ethernet Coax Transceiver provides an Ethernet connection to a standard Ethernet coaxial cable. Three types of connection taps are available: AMP piercing, N-type, and BNC-type taps.

ANC-20 2-port Transceiver offers dual AUI ports to connect two Ethernet stations, replacing two DEC H4000™ transceivers. Three taps available, same as ANC-18.

ANC-30F Fiber Optic Transceiver provides a direct fiber optic link between two Ethernet stations, a fiber optic interrepeater link between two Ethernet local repeaters, and fiber optic link for Ethernet active star connection networks. SMA or ST fiber optic connectors available for easy network installation.

ANC-80 8-port Fanout Transceiver provides 8 Ethernet connections per unit (up to 64 when cascaded). Functions in stand-alone or network mode with automatic switching feature.

ANC also offers a line of repeater products for cost-effective, flexible network configurations. For more information on any of ANC's products, call toll free (800) 343-LANS.

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for the chemical and pharmaceutical fields, have both endorsed CDA, as has Odesta Corp., maker of software products for information management.

Odesta, based in Northbrook, Ill., recently announced a new family of software for work flow and document management that it said will soon support CDA. Odesta Document Management Systems (ODMS) help managers track the progress of a document that is being developed by different people on diverse workstations.

Daniel Cheifetz, Odesta's founder and president, said that when later versions of ODMS support CDA, it will mean dramatic improvements for the system. Using the example of a newspaper page, Cheifetz said ODMS currently allows a user to track each piece of the page. Headlines, text and photos are each represented by icons, but the user must pull up each piece separately to view it. This involves complicated methods for accessing data contained on workstations running under different operating systems.

Under CDA, the user could see the whole page as it will actually look in finished form, Cheifetz said. To make a change in a certain paragraph of text, for example, the user would click on that paragraph and automatically be able to access the paragraph's source. Through live links, a change to the source would also change the compound document.

Woolf said CDA is consistent with emerging industry standards such as the International Standards Organization's (ISO) Open System Interconnection model.

(continued on page 90)

INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

"If there is a bottleneck in this industry right now, it is a manufacturing bottleneck created by [the Modified Final Judgment] restriction."

William Weiss
Ameritech chairman
and chief executive officer
Chicago

People & Positions

IBM last week named Richard Gerstner general manager of IBM Personal Systems, the U.S.-based group that makes personal computers, typewriters and printers.

Gerstner, who was group executive, IBM World Trade Asia/Pacific Group, will report to Terry Lautenbach, senior vice-president and general manager of IBM United States. Gerstner succeeds Senior Vice-President George Conrades, who in July was named general manager, U.S. Marketing & Services.

Succeeding Gerstner as head of the IBM Trade Asia/Pacific Group is Edward Lucente. Lucente previously reported to Lautenbach with responsibility for the manufacturing and staff consolidations in IBM United States.

Bill Bonin last week was named vice-president of North American operations for San Francisco-based X/Open Co., Ltd., a nonprofit corporation promoting development of an open application environment.

Bonin will be in charge of U.S. and Canadian operations. He will also lead the company's efforts to increase awareness in the marketplace of the standards that X/Open supports. Previously, Bonin was X/Open's national program manager for software vendor relations.

X/Open, whose list of 15 members includes AT&T, IBM and Digital Equipment Corp., was founded in 1984 to establish a set of industry standards for developing a portable software environment. □

AT&T losing ground to MCI, US Sprint

Competition heats up in long-distance market; international business is focus of carrier battle.

By Bob Brown
Senior Writer

While much attention is now being focused on competition in the domestic long-haul market, industry analysts point out that MCI Communications Corp. and US Sprint Communications Co. are quietly taking a growing chunk of AT&T's international long-distance business.

The proliferation of multinational companies is expected to lead to new opportunities for long-distance carriers to provide international voice service.

Analysts said MCI and US Sprint have an advantage in the international market because they can underprice AT&T, which is restricted by Federal Communications Commission regulations.

They said AT&T's rivals are also beefing up their international service offerings.

All three competitors use the same or similar satellite and cable facilities to transmit voice traffic, so differences in quality

will not be a major factor, according to the analysts.

"We're primarily focusing our attention on pricing," said Jerry DiMartino, vice-president of sales and marketing at MCI International, Inc., a division of MCI.

Currently, MCI and US Sprint together have about 10% of the international voice market, according to Steve Sazegari, a senior industry analyst at the market research firm Dataquest, Inc. in San Jose, Calif. MCI disputes that figure, saying that it has cornered about 10% of the market by itself. A US Sprint spokesman also said the figure is too low, but he would not venture an estimate for his company's market share.

Sazegari projected that within three years, MCI and US Sprint will have captured about 28% of the international voice market. That is roughly equal to the domestic long-distance market share the two carriers are expected to hold by 1992, Sazegari said. He said MCI and US Sprint had

(continued on page 10)

INDUSTRY BRIEFS

The Aries Group, Inc., a consulting firm in Rockville, Md., that informs its clients about tariff and regulatory issues and designs large voice and data networks, recently acquired the stock of **The Marketing Programs and Services Group, Inc. (MPSG)**, a consulting firm that focuses on private branch exchanges and intrapremises wiring, from MPSG Chairman John Rison. MPSG will become a wholly owned subsidiary of The Aries Group.

The Aries Group has annual revenue of \$1.4 million, while MPSG has annual revenue of \$813,000.

Rison will remain on MPSG's board of directors and serve as vice-chairman. Robert Ellis, currently president of The Aries Group, will become chairman of The Aries Group and MPSG.

As expected, **Case Communications, Inc.**, which makes statistical multiplexers, modems and X.25 products, and T-1 multiplexer maker **Datatel, Inc.** were recently merged into a new company called **Case/Datatel, Inc.**

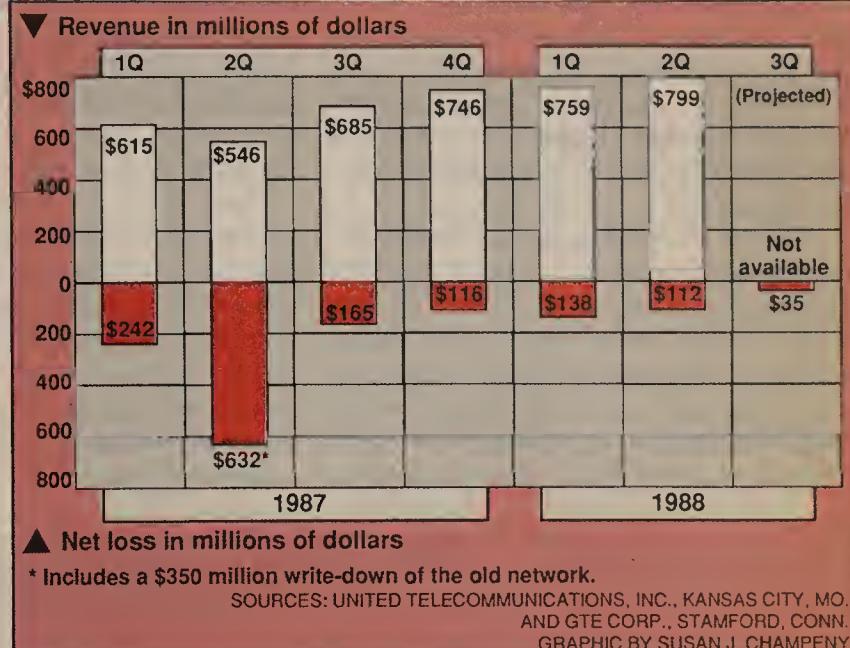
Both Case Communications, a subsidiary of the UK-based Case Group plc, and Datatel are owned by Dowty Group plc, a British company. Case Group was acquired by Dowty Group in August.

Case/Datatel will become part of Dowty Group's Information Technology Division, whose businesses in the U.S. also include Dowty RFL, Inc. and Dowty Electronics. The new company will be based in two locations: Cherry Hill, N.J., and Columbia, Md.

Digilog Inc., a manufacturer of data communications test and control equipment based in Montgomeryville, Pa., said recently it signed a letter of intent to acquire most of the assets of Danbury, Conn.-based **Network Control Corp.**, a manufacturer of voice telephone testing systems and equipment.

Digilog's move into voice testing will allow it to broaden its focus, the company said. □

US Sprint's financial results



MCI settles lawsuits over improper billing of users

Settlements could leave carrier paying \$3.4m.

By Anita Taff
Senior Correspondent, Washington

WASHINGTON, D.C. — MCI Telecommunications Corp. is moving toward settlement of two class-action suits brought against the company for improper billing of calls during the period from 1978 to 1985.

The lawsuits, one being heard in the Circuit Court of Cook County, Ill., and the other filed in the Eastern District Court of Michigan, seek refunds for customers who claim they were billed for unanswered long-distance calls. The lawsuits allege that MCI failed to adequately alert its customers that they might be billed for unanswered calls.

Although MCI claims that it charged its customers properly and fully disclosed its billing practices, the company has agreed to settle both claims. In the combined settlement, the carrier may pay up to \$3.4 million in refunds or service credits.

"We felt it was time to do away with people feeling that they hadn't gotten their money's worth with MCI," said John Worthington, senior vice-president and general counsel for MCI.

Additionally, the company wanted to avoid the burden and expense of further litigation, according to an official company statement.

Billing problems not unique

Such billing problems were not unique to MCI. In 1987, US Sprint Communications Co. agreed to an out-of-court settlement of a class-action suit brought by customers who had charged they were improperly billed for calls placed through GTE Sprint Communications Corp. between 1978 and 1985.

Earlier this month, MCI began notifying current and former customers of their potential right to refunds. Legal notices are being placed in several national newspapers such as *The Wall Street Journal*, and current customers will receive inserts discussing the issue in their bills by October, according to an MCI spokeswoman.

Under terms of agreements tentatively approved by the courts, customers who contact MCI will be reimbursed for incorrect charges in two ways. Current customers will receive credits to their accounts, and cash refunds will be paid to customers who now use other carriers.

Customers who cannot document the volume of calls incorrectly billed will be given 63 cents in cash or service credit for each full or partial year they used MCI services.

Customers who have records for the incorrectly billed calls can submit an itemized list to MCI for review.

If the company agrees with the customer's claim, a refund of 21 cents in cash or service credit will be issued for each improperly billed call.

"I suspect we won't agree with each and every claim form we receive," Worthington said. In that case, MCI will have to negotiate with the customer to reach an agreement. Worthington said he feels certain that all such arrangements will be reached before a court hearing scheduled for Jan. 5, 1989, at which the courts must decide whether to give final approval to the settlements.

MCI is unsure how many customers will contact the company for refunds, but the company estimates

(continued on page 11)

AT&T losing ground to MCI, US Sprint

continued from page 9

about 15% of the domestic market last year. "As you can see," Sazegari said, "MCI and US Sprint's progress has been faster in the international market. Two or three years ago, AT&T had 100% of the international market."

Eventually, MCI and US Sprint together will probably take a bigger share of the international pie than of the domestic market, he said.

MCI and US Sprint's share of the domestic long-distance market may turn out to be smaller than their international market share because many users made fundamental decisions about their domestic carriers before MCI and US Sprint started up, said William Burgess, vice-president and general manager of US Sprint's Interna-

tional Marketing department.

But as more companies expand internationally, it is likely that they will look at different options, he said.

Both MCI and US Sprint have won a number of contracts with large customers recently that could boost their international as well as domestic long-distance voice revenues, Burgess said.

Also, there are more carriers competing for users' domestic long-distance dollars than for their international long-distance dollars, Burgess said. One reason for this, he said, is the difficulty in getting permission from a country's post, telegraph and telephone administration to set up transmission facilities.

"I would say it's not improbable that

you will see our international share of the market exceed our domestic share," MCI International's DiMartino said.

Focus on international market

Since MCI became AT&T's first competition for international voice service in 1984, both MCI and US Sprint officials said that their companies have focused an increasing amount of their resources on this market.

Last week, for example, MCI announced that it will begin offering an international calling card service in October and international collect calling in the first quarter of 1989. These are services that only AT&T provides currently.

The week before MCI's announcement, US Sprint unveiled a 10%-off sale of its Global Fon international voice services effective Jan. 1 through March 31. The com-

pany said users can save up to 34% vs. AT&T's rates on international long-distance calls.

AT&T has responded to growing domestic competition in a number of ways, including the filing of Tariff 12 and Tariff 15 proposals with the FCC that offer special pricing to large customers.

The carrier has also responded to MCI and US Sprint's international long-distance push with discounts on its International Plus long-distance service for business customers and expansion of its international 800 service. The company recently filed a tariff with the FCC to add the Philippines to its list of 31 international 800 countries.

(DiMartino noted that MCI International recently responded to price cuts by AT&T for direct-dial international service with a tariff filing of its own to cut rates for some large users by up to 22%).

According to an AT&T International official who asked not to be named, most of the changes in the way AT&T runs its international business are made in response to users' needs, not in response to US Sprint and MCI.

However, another spokesman for the carrier said it is possible that AT&T International would shift employees from staff to sales positions to cut expenses and gain a greater presence at the customer level. Such a move would be part of a competitive strategy, he said.

AT&T feeling pinch

"AT&T is feeling the pinch" in the international market, according to Robert Ellis, chairman of The Aries Group, Inc., a Rockville, Md.-based consulting firm specializing in tariff and regulatory issues.

He said MCI and US Sprint must continue expanding their international services.

"There are AT&T customers who would switch to one of the other carriers except that AT&T offers a better tie-in to international service and an international credit card service," Ellis said. "MCI and US Sprint can't let that continue."

The international voice market will be worth about \$3.5 billion this year, according to Dataquest. Sources at US Sprint, however, estimated the market to be worth as much as \$8 billion.

According to Sazegari, revenue from international voice services will grow by \$600 million, from \$2.9 billion in 1986 to \$3.5 billion by year's end. He said revenue will increase to only \$3.7 billion by 1992, up \$200 million. Traffic will rise about 7% a year, but prices will drop by as much as 30% by 1992, thanks to higher capacity offered via new underwater fiber transmission cables, Sazegari said.

The carriers "will probably be a little more cautious about cutting prices than they were in the domestic market," said Gerald Mayfield, president of DMW Enterprises, a division of telecommunications consulting group DMW Group, Inc. in Stamford, Conn. "Hopefully, everyone learned a little restraint to preserve margins."

MCI is also promoting the fact that it has offices supporting its international voice service in about 50 countries, thanks to several acquisitions it has made in recent years, including that of Western Union International, Inc. and RCA Global Communications, Inc.

AT&T has upped its presence in other countries over the past couple of years so that it now has offices serving international voice customers in 20 countries, a company spokesman said. The additional offices have not been commissioned in response to competition, he said. □

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Twelve products from 9 vendors receive latest ComForum Awards

By Wayne Eckerson
Staff Writer

CHICAGO — The National Communications Forum recently announced that 12 networking products have won this year's ComForum Awards for innovation, uniqueness, market impact and benefits to users.

The products, from nine different vendors, will be spotlighted at the 1988 forum, which will be held Oct. 3 through 5 at the Hyatt Regency and the Holiday Inn at O'Hare, Ill.

Frank Splitt, chairman of the ComForum Awards Committee, said, "The National Communications Forum recognizes organizations and individuals for excellence and highlights technological advances in communications and computer products."

AT&T Network Systems Group's products earned three awards and Northern Telecom, Inc.'s earned two. In addition, products from Nynex Corp., IBM, Ameri-

tech Services, Inc., Rockwell International Corp., Zenith Electronics Corp., Tellabs, Inc. and Siemens Public Switching Systems, Inc. each received an award.

More than 4,500 people are expected to attend the forum, which will feature 164 seminars on management and engineering topics in the field of communications.

The forum is sponsored by the National Engineering Consortium, a nonprofit organization for continuing education run by top executives of 18 leading industrial companies.

The following products received ComForum Awards:

- Tellabs' Crossnet 440 and 445 T-1 networking systems.
- AT&T Network Systems' Macstar II End Customer Management System, which helps telephone companies give customers control over their networks.
- AT&T Network Systems' FT Series G Lightwave System, a lightwave transmission system that operates at 1.7G bit/sec.
- AT&T Network Systems' Overview Scanner and Scanware, a personal computer-based graphics imaging system and software.
- Northern Telecom's Networks Division's Space Meridian Customer Defined Networking, a product family that allows users to support hybrid, multivendor networks.
- Northern Telecom's DMS SuperNode fault-tolerant switching system.
- Rockwell International's Network

MCI settles lawsuits over improper billing

continued from page 9

mated that there were about three million users during the seven-year period covered by the lawsuit. However, as part of the court settlements, total customer refunds cannot exceed \$3.4 million, Worthington said.

Once the agreement is finalized, no further suits can be brought against MCI on the matter unless parties covered under the class-action suit specifically exclude themselves in order to bring an individual suit, he said.

The company does not expect such billing problems to occur in the future, Worthington said.

Worthington said the calls were incorrectly charged in the past because MCI could not get access to the call-supervision technology used by AT&T for billing until equal access was in place.

Now, 94% of MCI's lines are covered by equal-access arrangements, so MCI has access to the same technology as AT&T, he said.

Reaction to the settlements was generally neutral, with several analysts saying the \$3.4 million refund payments would not hurt MCI financially. Gregory Sawers, an analyst with Sanford C. Bernstein & Co., Inc. in New York, said the refund payment was insignificant and would "get lost in the noise."

Steve Sazegari, an analyst with Dataquest, Inc., a market research firm in San Jose, Calif., said, "\$3.4 million is just peanuts to MCI."

Jeff Close, senior consultant with the DMW Group, Inc., based in Stamford, Conn., agreed that the refund payments will have little impact on MCI and described the potential for future billing complaints as a nonissue.

However, Sazegari was less convinced that MCI had completely overcome its billing problems.

Equal access gave MCI only a portion of the technology it needs to resolve billing problems, Sazegari said. This issue "will continue to haunt" the carrier until out-of-band signaling systems, such as Common Channel Signaling System 7, are available to handle billing, he said. □



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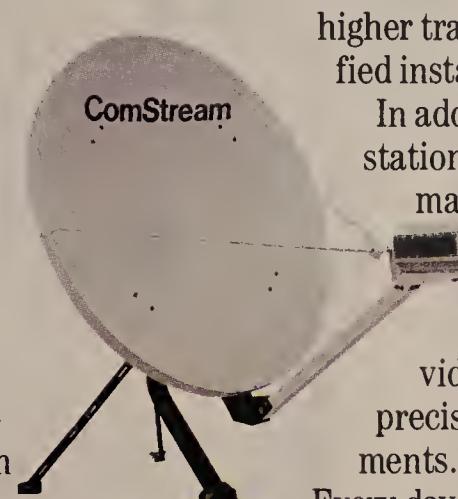
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If you want to know more about the StarLink series of earth stations, call ComStream at (619) 458-1800.

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Worth Noting

Great Lakes
Communications Corp., a Glen Ellyn, Ill.-based used equipment dealer, will host an AT&T Dimension private branch exchange users meeting at the Lisle Hilton hotel in Lisle, Ill., on Oct. 26. The Dimension Users Group V meeting will feature seminars on topics such as disaster recovery. For more information, call Patricia O'Hearn at (312) 858-0333.

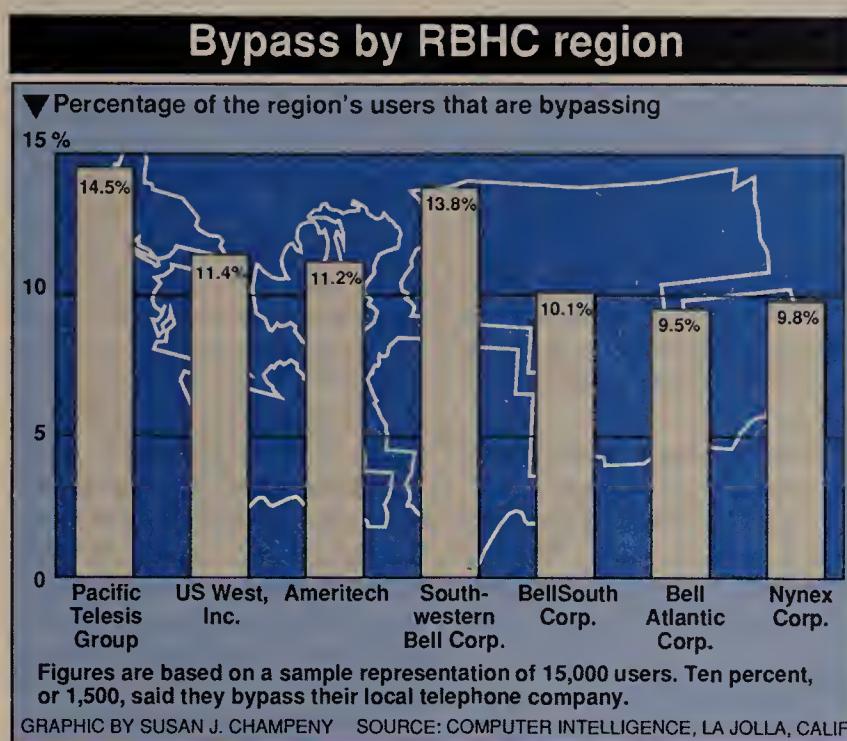
Carrier Watch

US West Information Systems, Inc. recently announced an agreement with **AT&T Network Systems Group** under which US West Information Systems will resell AT&T Integrated Services Digital Network terminals and other products.

US West Information Systems will market AT&T's complete line of ISDN terminals, which support ISDN Basic Rate Interface service over existing telephone lines. With the Basic Rate Interface, voice and data signals are transmitted over two 64K bit/sec channels. A third 16K bit/sec D channel is used to carry signaling information.

Pacific Telecom Cable, Inc. (PTC) recently announced that the planned fiber-optic undersea cable stretching from Oregon to Japan will transmit data at speeds of 1,260M bit/sec, a 50% greater capacity than originally planned.

The owners of the cable — PTC, International Digital Communications, Inc. and UK-based Cable and Wireless PLC — said construction of the cable will be finished by early 1990. PTC officials said the cable will host carrier traffic and dedicated lines. □



Users, carriers remain at odds in price cap debate

Critics, proponents spar in reply comments.

By Anita Taff
Senior Correspondent, Washington

WASHINGTON, D.C. — Users and vendors continued to clash over the Federal Communications Commission's proposed price cap regulations in reply comments filed recently with the agency.

User associations, many of which have said that carriers will benefit more than consumers under the price cap plan, expressed disbelief that the regional Bell holding companies had asked for greater latitude in earlier comments.

User associations expressed disbelief that the RBHCs had asked for greater latitude.



In those earlier comments, the RBHCs asked for a number of changes to the price cap plan, including reducing the number of service categories to be capped, increasing the carriers' flexibility to raise or lower prices and decreasing productivity estimates for the carriers.

The productivity estimate is part of the formula used to determine how much price caps will change on an annual basis. It measures improvements in network productivity and offsets factors that would increase prices, such as inflation.

Those requests, users and consumer groups said in reply comments, will further tilt the regula-

tory plan in favor of the carriers.

The Ad Hoc Telecommunications Users Committee labeled the RBHC requests as tactical scheming rather than serious proposals. The RBHCs "propose the most extreme revisions to the [price cap] proposal in hopes of providing a counterweight to the more balanced, reasoned proposals of many other parties," the association said.

Price cap regulation would put a ceiling on the prices carriers can charge for interstate services, rather than regulating profits, as is currently done under rate-of-return regulation. To ensure that consumers benefit from the new regulation, the FCC has proposed that rates be capped at current levels, with future rate increases limited to the rate of inflation minus 3%. By applying this 3% productivity factor, FCC officials claim users will save \$1.6 billion over current regulation during the first four years of price caps.

However, the level at which the FCC sets the productivity factor has been particularly controversial and, in their reply comments, users once again urged the FCC to further review the matter. Many user associations and interexchange carriers, including AT&T and MCI Communications Corp., argued that the 3% productivity factor is too low for the RBHCs, while many of the local exchange carriers argued that it was too high.

"The [Tele-Communications Association, Inc.] believes the record supports a productivity factor of not less than 4% for AT&T and not less than 6% for the local exchange carriers. The carriers' efforts to limit the productivity adjustment to 2% would

(continued on page 17)

EDI hot topic among telecom companies

Carriers, network vendors share electronic data interchange strategies at Telexpo '88 show.

By Bob Wallace
Senior Editor

DETROIT — Telecommunications equipment vendors and telephone companies discussed their electronic data interchange (EDI) implementation strategies at the Telexpo '88 conference here recently.

Vendors, like users, have implemented EDI networks to improve operations and cut paperwork. In presentations at the conference, Hewlett-Packard Co. and Northern Telecom, Inc. said EDI has helped them cut the amount of time it takes to obtain manufacturing materials, slash purchasing costs and increase buyer productivity.

Pacific Bell said EDI is helping it solve a four-year billing problem.

The Telexpo '88 conference was designed to promote the use of EDI and bar-coding technologies by vendors in the telecommunications industry. More than 150 vendors and exhibitors at-

tended the two-day event. New applications for EDI, such as the electronic transmission of telephone bills, were discussed at the conference.

Telexpo '88 was sponsored by the Telecommunications Industry Forum (TCIF) and the Automatic Identification Manufacturers ("TCIF urges industry to make use of EDI," NW, June 13).

Officials of BellSouth Services, Inc. — the research and development group for Southern Bell Telephone and Telegraph Co. and South Central Bell Telephone Co. — said the Bell operating companies plan to use EDI to transmit telephone bills to their largest customers.

EDI is the computer-to-computer transmission of business documents, such as purchase orders, invoices, manifests and advance-shipping notices, in standard formats.

HP, an early EDI promoter, said it has realized a variety of

(continued on page 16)

WASHINGTON UPDATE

BY ANITA TAFF

ISDN showcased at user meet. The National Institute of Standards and Technology, formerly the National Bureau of Standards, is sponsoring a meeting this week of the North American ISDN Users' (NIU) Forum at which 20 ISDN applications will be demonstrated.

Among the applications to be demonstrated are desktop conferencing, local networking, compressed video transmission and incoming call management. Southwestern Bell Telephone Co. will provide an Integrated Services Digital Network-compatible switch for the demonstration. The applications will come from a number of other vendors, according to Don Berteau, a member of the ISDN forum.

The meeting is the first joint gathering of the two subgroups of the NIU Forum: the ISDN Implementors' Workshop and the ISDN Users' Workshop. The NIU Forum was formed to give users a greater role in the development of ISDN applications.

MCI's McGowan blasts Ameritech and RBHCs.

In a blunt statement last week, MCI Chairman William McGowan sharply criticized Ameritech's efforts to generate support for elimination of the regional Bell holding company business restrictions imposed by the AT&T Consent Decree. Earlier this month, Ameritech Chairman and Chief Executive Officer William Weiss urged Congress to proceed with legislation freeing the RBHCs to enter information services and manufacturing.

Speaking before the Federal Communications Bar Association, McGowan said he had little sympathy for such efforts because all seven of the RBHCs agreed to the provisions of the Consent Decree.

Now they "act as if they just woke up out of a dream and can't figure out what happened," McGowan said. He said regulators had reached "a sober realization" that monopoly

(continued on page 17)

Voice mail systems group to hammer out standard

AMIS User/Vendor Council's final specification to include long list of desired capabilities.

By Bob Wallace
Senior Editor

SAN FRANCISCO — The Audio Message Interface Standard (AMIS) User/Vendor Council will convene here this week to develop what it hopes will become an open standard for networking heterogeneous voice mail systems.

The AMIS User/Vendor Council — members of which include several large corporations and five voice mail system vendors — will use parts of an existing specification to build the standard. The specification will come from The Coca-Cola Co., which had asked its voice mail suppliers, IBM/Rolm Systems Division and VMX, Inc., to create an analog scheme to link their voice mail systems.

Roger Benson, a telecommunications services technical specialist for Eastman Kodak Co., one of the group's founders, said internetworking requirements listed in the IBM/Rolm-VMX document will be included in the final specification.

Those requirements include a long list of desired capabilities. One feature Benson said users want AMIS to support is the analog transmission of message and control information among different makes of systems. This would allow users to send a message to one or more mailboxes,

The group encountered resistance to basing the scheme on analog technology.

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receive messages, reply to a message or redirect a message across the network.

Users also want to be able to pass the sender's mailbox address and the sending system identification data across the network, as well as to verify that messages were actually delivered, Benson said.

The net standard should also make it possible to notify the sending system if a remote mailbox is invalid or unable to accept the message, or if the receiving system does not support the type of message sent, he explained.

He said users want a standard that will tell sending party if the target system's storage is full, as well as if the target mailbox is full or not accepting messages.

The AMIS User/Vendor Council includes The Coca-Cola Co., General Electric Co., Pacific Bell and The Travelers Corp. Vendor

members include IBM/Rolm Systems Division, AT&T, VMX, Octel Communications Corp. and Centigram Corp.

At its most recent meeting, held at the Voice '88 conference in June, the group encountered resistance to basing the network scheme on analog technology. AT&T, backed by Northern Telecom, Inc., Digital Sound Corp. and Tigon Corp., urged the group to consider a higher quality digital networking scheme ("Dissent may slow V-mail net standard," NW, June 20).

The meeting will be held Sept. 29 and 30 at a Pacific Bell facility here. Those interested in attending should notify Hatfield Associates, Inc. Only those enrolled as participants can attend the second day of the meeting, but all interested parties can attend the first day. Hatfield Associates, located in Boulder, Colo., can be reached at (303) 442-5395.

The AMIS User/Vendor Council will also attempt to create a formal structure for the group at the meeting and set guidelines for such procedures as voting, submission of documents and formats for future conferences.

The meeting will feature a two-hour explanation of the user-led effort, which began in December 1987. The presentation is geared toward new members, according to Robert Mercer, a spokesman for Hatfield Associates. □

EDI hot topic for companies

continued from page 15

benefits from its widespread use of the technology. The firm began working with EDI about six years ago.

Today, 30 HP divisions, including three in Europe, electronically transmit purchase orders to the company's 13 largest suppliers. Roughly 25% of the corporation's purchasing is done through EDI, according to Sandy Whitson, program section manager for HP.

"Our strategy is to bring only our largest suppliers up on EDI, regardless of how [technically] sophisticated they are," Whitson explained. "Our strategy has not been to go after the masses."

Obstacles to EDI

Industry observers have deemed HP's EDI implementation a success. But Whitson and the company had to overcome several major obstacles over the past several years.

The biggest challenge Whitson faced was uniformly implementing EDI throughout a widely distributed corporation. Whitson convinced each of HP's 55 Corporate Manufacturing and Information Systems division locations to install custom software developed by HP on its computers.

"We have made the [standard] software a prerequisite to EDI within HP," Whitson said. "We wanted to appear as a single company to our suppliers, not as 55 different companies."

At present, HP's EDI users send orders over the firm's corporate network to a so-called gateway at the company's Palo Alto, Calif., headquarters. Once

there, the orders are translated from proprietary to standard formats, batched and sent to suppliers over one of several third-party value-added networks (VAN) HP uses. Whitson would not say which VANs the firm uses.

Early on, Whitson had to create a task force dedicated to managing EDI efforts throughout HP. The special committee included representatives from the company's manufacturing, finance, marketing, transportation and corporate information systems groups.

The group was chartered to define HP's strategic EDI goals, Whitson recalled. These goals included spreading EDI knowledge throughout HP, truncating purchasing lead times, minimizing administrative overhead and supporting EDI standards, she explained.

The EDI task force also helped distribute the EDI knowledge of a few people to many. "We estimated the EDI learning process takes an average of nine to 12 months," Whitson said. HP lost several of these early graduates to other companies — a development that threatened to slow, or stop, the spread of EDI throughout the corporation.

"It is just too expensive an investment to train someone on EDI and then have that expert leave," Whitson explained. "We needed to broaden the base of EDI knowledge quickly."

By using EDI, HP has cut the time it takes to get materials from four or five weeks to five to 10 days, Whitson said. "When we exchange orders with suppliers using EDI, we also cut the cost of getting those materials."

EDI is helping HP trim administrative costs by reducing the

number of people needed to manually enter data for paper documents.

Although it has meant spending more money for custom software early on, HP has stuck with its policy of using EDI standards, such as ANSI's X.12 standards, to handle electronic transactions. Whitson said the company will soon begin pilot-testing EDI For Administration, Commerce and Transport — a new international EDI standard ("Global EDI standard put to the test," NW, Aug. 8).

Although using EDI provides HP with many benefits, Whitson said cost-justifying the EDI program early on was difficult.

"For the first few years, we were paying more for EDI purchase orders than paper orders," she recalled. The average EDI order cost \$1.65, while the same order on paper cost \$1.08. Now, the EDI order costs 50 cents, while the paper order stayed at \$1.08.

“Our strategy is to bring only our largest suppliers up on EDI," HP's Whitson said.

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Start-up costs, including development of custom mainframe software, kept the cost per EDI purchase order above the cost of paper orders early on, Whitson said.

HP customers will benefit from the success of the company's EDI program, Whitson pre-

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dicted. "By using EDI, we will be able to reduce the number of people needed to manually enter purchase order data and eliminate mistakes in that process. This will eventually allow us to reduce the price of the products we sell," she said.

Reducing the prices of its products was only part of the reason why Northern Telecom became interested in EDI. The switch maker is looking to the technology to help increase the amount of time its buyers spend on buying, rather than paperwork.

The firm asked its supplier to explain how much of its time is spent on each of three different functions, according to Frederick Smith, material and purchasing systems director for Northern Telecom. The results were shocking, Smith said.

Northern Telecom found that its buyers were spending 54% of their time on purchasing administration, which Smith described as paper shuffling. The buyers were spending 30% of their time on planning and forecasting and the remaining 16% on inventory control, he explained.

Northern Telecom wants its buyers to spend 50% of their time planning and forecasting, 30% handling inventory control and 20% on purchasing administration, Smith said.

"We want our buyers to manage logistics, not paper," Smith said. Northern Telecom's use of EDI has allowed it to cut the amount of time it takes to obtain manufacturing materials, slash purchasing costs and increase buyer productivity.

Pacific Bell is utilizing EDI to avert a billing disaster. "At divestiture, we inherited 5,100 con-

tracts, more than 30,000 purchase orders and 57,500 invoices," said Raymond Wetteland, director of procurement services for the Bell operating company.

"Our business is providing dial tone to our customers, not handling procurements," Wetteland explained. "We had no idea what we were doing in that area."

The BOC initially bought word-processing software that allowed its workers to create purchase orders on personal computers — orders that were then printed and mailed to suppliers.

In 1985, Wetteland recalled, "We started calling our suppliers and placing orders over the telephone."

The BOC began sending purchase orders using EDI in 1987. Pacific Bell was slated to meet today with its top 50 vendors to discuss the merits of EDI. Wetteland estimated the BOC will be sending EDI purchase orders to this group of suppliers by June 1989.

Two other BOCs, Southern Bell and South Central Bell, are expected to use EDI to offer an enhanced billing service. BellSouth Services said the two BOCs plan to send large customers their telephone bills using EDI. At least one Southern Bell customer, Georgia Power Co., an Atlanta-based utility firm, had pushed the BOC to offer these services. ("Utility firm pushes telcos to bill via EDI," NW, June 6, 1988.)

Daniel Peter, a staff analyst with BellSouth Services, said the BOC will send telephone bills — along with data not included in current paper bills — to its customers electronically. This information may include a monthly inventory of all BOC-provided services and equipment. □

Users, carriers remain at odds

continued from page 15

enable them to enjoy excessive profits at the taxpayers' expense," said a TCA spokesman.

AT&T claims that the productivity factor applied to its price caps should be eliminated or lowered but the productivity factor of the RBHCs should be raised.

User associations and other groups told the FCC they fear the quality of service will deteriorate if price caps are implemented.

retained in the price cap plan, does not address service restoration times, abandonments of service or the establishment of carrier serving centers.

AT&T, however, dismissed claims that carriers would try to maximize profits by cutting network quality, saying such tactics would be self-defeating in the long run. "Degradation of inter-exchange service means fewer completed calls, lower customer satisfaction and lower revenues," AT&T said.

Southwestern Bell Corp. ac-

cap regulation that may be worsened if applied to the RBHCs. Such problems include the possibility of excessive pricing flexibility; anticompetitive pricing, which would allow the RBHCs to price services according to the level of competition rather than the cost of the service; cross-subsidization, which would let the RBHCs finance unregulated business ventures with revenue from regulated telephone operations; and the FCC's failure to properly review the RBHCs' activities.

User associations continued to attack fundamental assumptions of price caps. For example, the ICA questioned whether a new form of regulation is needed at all. "The commission leadership [has] appeared unwilling to effectively administer the existing system of rate-of-return regulation," ICA said in its filing.

"It is open to question whether ratepayers will be better off under the price cap plan than under a conscientiously administered system of traditional rate-of-return regulation."

MCI questioned whether the FCC had given adequate thought to implementation issues associated with price caps. For example, MCI said it isn't clear how and when carriers would be allowed to raise prices under the plan.

The lack of such a criterion "underscores the lack of attention that has been paid by the commission to the procedures that would be followed and the actual administration of price cap regulation," MCI argued. The issues at stake are too important to "wing it," the carrier said and unless ground rules are established, tariff proceedings "will inevitably become unduly confused, litigious and protracted." □

The issues at stake are too important to "wing it," according to MCI.



The National Association of Regulatory Utility Commissioners (NARUC) said it fears the RBHCs will reduce levels of maintenance and network improvements in order to cut costs and increase profits under price caps.

Whether deterioration of service quality occurs quickly or slowly, "the remedy is almost always prolonged and costly," NARUC said. The association urged the FCC to implement rules specifying technical standards for service quality.

TCA also asked the FCC to adopt standards governing service quality and said that improvements are needed in the way the RBHCs are required to report customer service problems. Describing it as wholly inadequate, TCA said the current reporting system, which would be

known that quality of service is a key issue in price caps, but said the real problem is not whether the RBHCs "will allow 'creeping dilapidation' of the network, but whether the U.S. faces the potential for galloping obsolescence of the public network relative to other nations."

Nynex Corp. said service quality would be maintained under price caps because users would continue to purchase service under tariffs, which guarantee specified levels of service and transmission quality.

The International Communications Association (ICA) urged the FCC to reject price cap regulation for the RBHCs and proceed with implementation for AT&T only.

NARUC said the FCC faces a number of problems with price

Washington Update

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control of the telecommunications industry was no longer in the public interest.

Another reason McGowan has little sympathy for the RBHCs, he said, is that they have failed in most business ventures conducted through unregulated subsidiaries, which are free to enter markets off limits to the regulated telephone companies. "I'd feel a whole lot better if the RBHCs seemed as interested in upgrading local service and in providing truly equal access as they are in building skyscrapers and running computer stores," he said.

McGowan did not confine his criticism to the RBHCs, however, as he blasted the Federal Communications Commission's record in handling RBHC regulation.

"Instead of devoting scarce resources to figuring out how the RBHCs can evade the antitrust settlement, the FCC should promote competitive forces free from the influence of bottleneck monopolists," the MCI chairman said. □

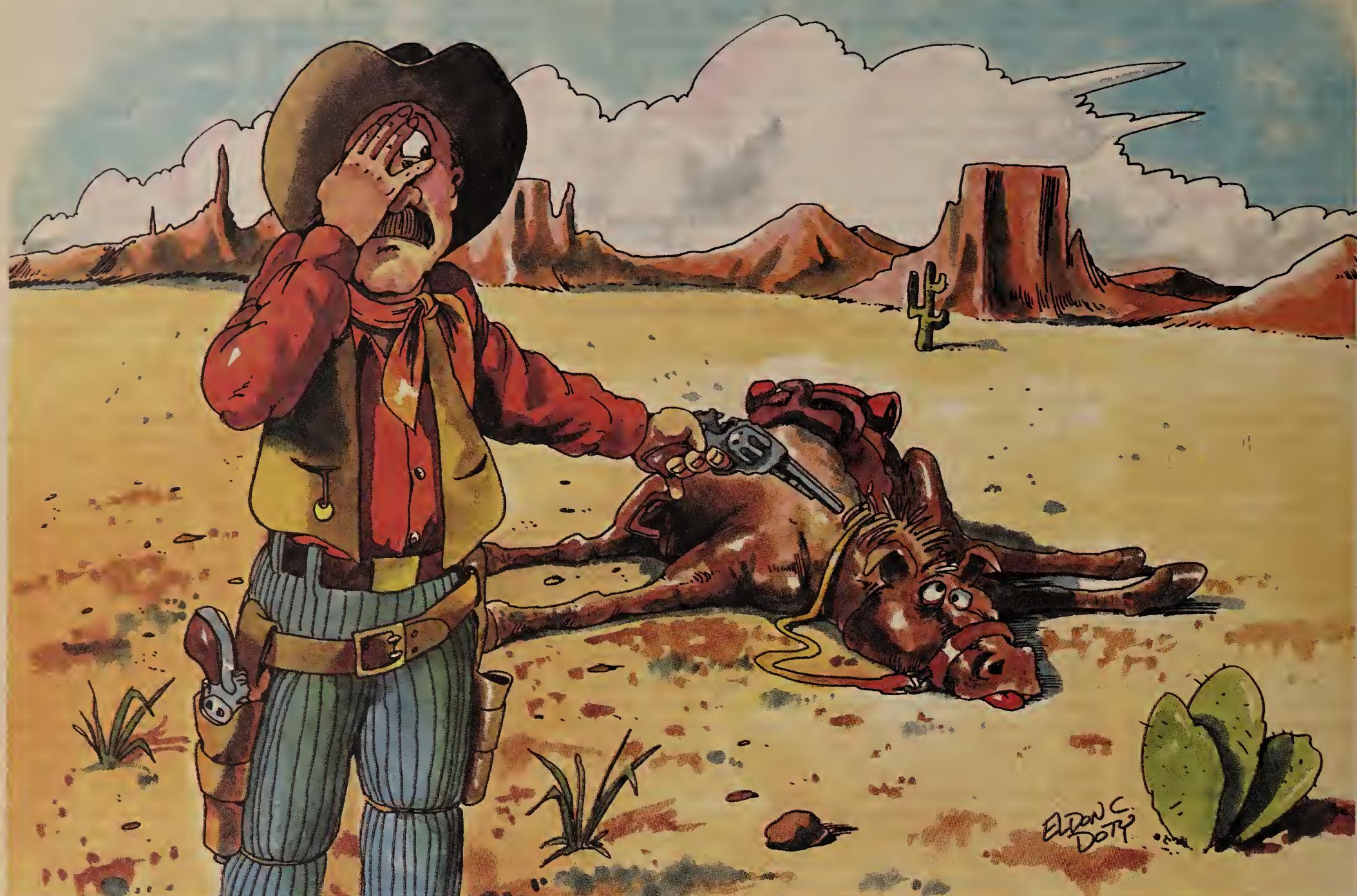
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Worth Noting

"We have moved NetView a long way forward in making it a total network management tool with these announcements."

Robert Anderson
IBM manager of telecommunications software product management
On the NetView upgrades IBM announced last week

Association Watch

Astrocom Corp. recently announced a multiplexer that uses both statistical and time-division multiplexing techniques.

The Astrocom 4100, which can support synchronous and asynchronous traffic, comes in a basic four-port model that expands to 32 ports in increments of four. Port speeds range up to 19.2Kbit/sec, and the composite link speed can reach 72Kbit/sec.

Each port on the 4100 can be individually configured for either multiplexing technique.

Prices vary by configuration. A model that allows the maximum speed of 72Kbit/sec on the composite side ranges in price from \$3,595 to \$7,495. A model with a maximum speed of 19.2Kbit/sec is priced from \$2,995 to \$6,895. A model that performs only statistical multiplexing costs from \$1,895 to \$5,795.

Astrocom is located at 120 W. Plato Blvd., St. Paul, Minn. 55107, or call (612) 227-8651.

DataAmerica Corp. recently agreed to buy more than \$1.3 million worth of packet-switching equipment from Northern Telecom, Inc. that it will use to establish a national packet data network.

The network will reach 54 major local access and transport areas by the end of October and 80 LATAs by the end of the year. The first group of switches will be installed in Atlanta, Chicago, New York, San Diego, San Francisco, Washington, D.C. and Tampa, Fla. □

Planning is the key to net management

To choose the best net management system, users must study their corporate needs, goals.

By John Cox
Senior Editor

FRAMINGHAM, Mass. — Getting the most out of a network management system owes as much to careful planning as it does to actual product selection.

"The biggest problem for most people is they haven't done their homework in looking at their organization and determining the things they want to accomplish," said John Dretler, president of The Info Group in Framingham, Mass.

The Info Group sells ATMS, a software package that addresses some of the financial and administrative tasks of network management, like managing equipment inventories, tracking cable and processing accounting data.

Dretler's company prepared an informal study, based on its experience with roughly 200 customers, to determine the key steps in evaluating and implementing management systems

for voice/data networks. Although the guidelines concern The Info Group's type of product, the lessons apply to other aspects of network management at large.

The report outlines eight areas of consideration for communications managers evaluating and implementing a management and control system from any vendor.

The first step is to achieve a thorough understanding of the organization's current communications environment and a realistic projection of its needs for the next three years. This needs analysis should take into account equipment, procedures, work loads, job descriptions and management reports within the telecommunications department.

One major problem in putting together an accurate needs analysis, which becomes the basis of a request for proposal, is a tendency to see network management

(continued on page 22)

Image-processing system, satellite network unite

By John Cox
Senior Editor

OTTAWA — A recently signed joint marketing agreement will unite a document image-processing system from FileNet Corp. with a high-speed satellite communications system from International Datacasting Corp.

The agreement will enable users to swap digitized documents stored on optical disks between a central corporate facility and a web of remote locations, such as sales offices. The combined system is aimed at companies that move large numbers of paper documents, officials of both companies said.

Under the terms of the agreement, the two companies will offer a system that joins the Ethernet-based FileNet Document Image Processing System with International Datacasting's Image/500, a satellite network designed to distribute digitized images from one central location to numerous remote sites.

With Image/500, customers at remote sites use 2,400 bit/sec dial-up telephone links to request image files from a central corporate location. The files are then distributed at 512Kbit/sec over a satellite link.

FileNet's document system consists of components linked by an Ethernet local network. Scanners read microfilm, paper documents and books, and then store the digitized information in banks of optical disks. Users at FileNet workstations can call up the files they want and print them out on high-resolution laser printers. The entire system is managed by FileNet's WorkFlo software.

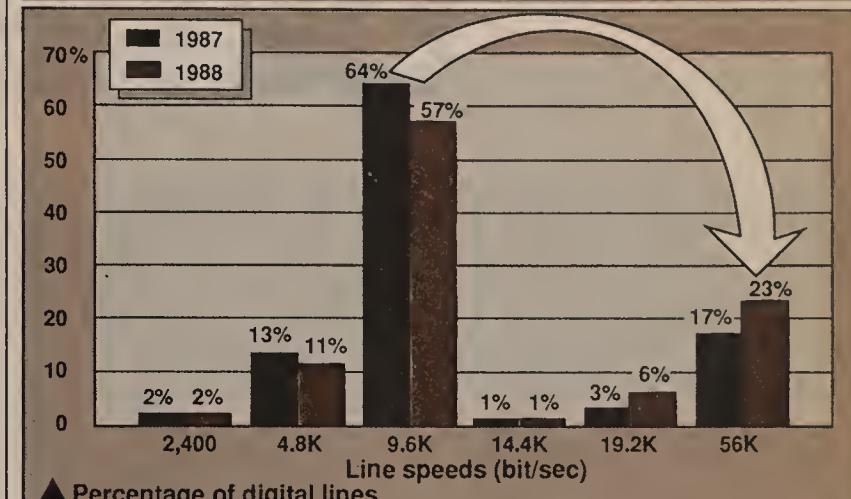
FileNet will interface to the Image/500 system through an Ethernet link to International Datacasting's intelligent bridge, a device manufactured by Wellfleet Communications, Inc. That bridge routes file requests by the dial-up link and manages satellite communications.

The same type of bridge is used at the customer's central hub. Incoming file requests are passed over an Ethernet link to a FileNet system, which tracks down the right optical disk and accesses the requested file. The file passes back over the Ethernet, through the bridge to a packet multiplexer, and then to a satellite transmission facility at the customer's central site.

The combination of systems is a cost-effective way of handling

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Users shift to higher speed digital lines



Most end-user digital transmission lines still run at 9.6K bit/sec, but one-third now run faster.

SOURCE: COMPUTER INTELLIGENCE, LA JOLLA, CALIF.

GRAPHIC BY SUSAN J. CHAMPEY

AT&T dial-up option for credit card service debuts

AT&T customers can phone in for verification.

By John Cox
Senior Editor

BASKING RIDGE, N.J. — AT&T recently announced a dial-up access option and new per-transaction pricing for its credit card validation service.

Previously, users of AT&T Transaction Services could access the service only through dedicated lines. Now customers can dial in over the public network, and they are charged per transaction.

AT&T offers the service, introduced in April 1986, to banks and other companies that offer credit card authorization to retailers. The AT&T service connects the point-of-sale terminals in a store with host processors at the authorizing bank or credit card company. The new option allows this link to be a dial-up connection.

The store terminal can now log on to the system for each transaction. AT&T converts the asynchronous terminal traffic to X.25 packets and routes them over its Accunet Packet Service to the host, according to Priscilla Cronin, Transaction Services staff manager.

The service supports several retail industry protocols, such as the so-called VISA protocols, and will support other protocols for a fee at the customer's request, she said.

The per-transaction price for the public dial option ranges from .04 cent for low volumes during peak hours down to .023 cent for more than 600,000 transactions per month during off-peak hours.

Where local dial access is not yet available, users can employ AT&T 800 Service, for which there is a .09 cent per-transaction surcharge, according to Cronin.

Now available in 324 cities, AT&T Transaction Service offers

24-hour operations and support from a customer assistance center.

AT&T will continue to offer the dedicated access option for a monthly charge of \$200 per port plus a per-transaction usage charge. Cronin said this option will remain attractive to some customers because of the additional services available to port customers. These features include the ability to identify lost, stolen or invalid cards.

"But we found that customers also wanted inexpensive trans-

T he per-transaction price for the public dial option ranges from .04 cent down to .023 cent.

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port. That was their main goal," Cronin said. "Also, the pricing was only on a per-port basis before. We found customers wanted per-transaction pricing."

Overall, customers now view these transport services "almost like a commodity," she said. But that may change, she said, as the competing validation services start trying to distinguish their offerings to retailers. AT&T, for example, will offer retailers services such as prescreening a transaction for invalid cards and allowing a denial to be issued before the transaction is sent over the network.

Other services include testing and diagnostic services and taking over authorizations, within predetermined limits, if a host computer fails. □

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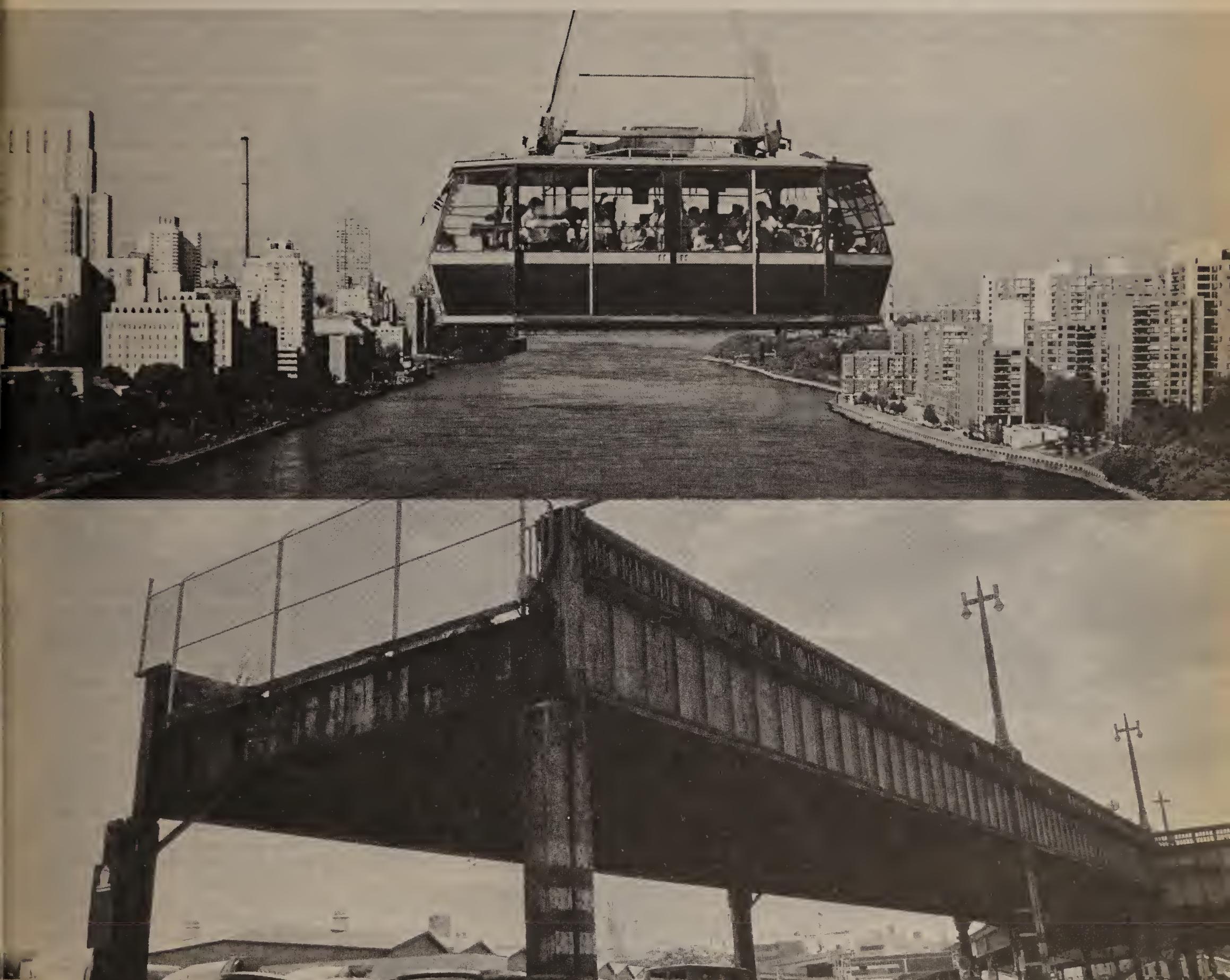
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Planning is the key to net management

continued from page 19

and control only in departmental terms, Dretler cautioned. The control system may run as a departmental application, but it is managing a corporate resource.

"If the voice or data communications department is responsible for pursuing the net management solution, they need to look at it from a corporate standpoint," he said.

The needs analysis of one large corporation, for example, uncovered problems with the manual system used to manage system changes, such as moving equipment or changing software. The company was unable to correctly charge users for equipment and long-distance calls, nor was it able to maintain control over the location of company equipment.

The second step is to match these needs against particular management and control products.

The needs analysis creates a foundation for detailing exactly what information is needed to improve control in a particular area, such as change management or inventory control.

Technical evaluation

The third step in the evaluation process is a more technical analysis of the products themselves, comparing things like performance and efficiency, ease of use, compatibility and so on. The report recommends that communications managers who are not part of an MIS department work as closely as possible with MIS be-

cause of the growing sophistication of networks.

"People tend to underestimate the number of terminals they need and the need for good backup procedures. These control systems tend to have huge data bases, measured in hundreds of megabytes of memory," Dretler pointed out.

Even microcomputer-based control systems are no longer simple, he said. The machines incorporate powerful new microprocessors, support multitasking and can often support several users.

The technical considerations in the third step include such software items as data base file structure, the ability to customize reports, interfaces with other software systems, and hardware items like disk space and main memory requirements, hardware interfaces and even printer speeds.

In the fourth step, which involves analyzing the vendor, the report recommends users evaluate the vendors' implementation and support capabilities. Once a user makes his choice, Dretler said, "you're going to live with that vendor forever. Anytime there's a major change in your organization or you introduce new technology, that's going to be reflected in your network management system."

Users can consider the vendors' staff and experience, their availability (during and after implementation), testing and backup resources.

System implementation is the fifth step, and one that should use the battery of project management tools now available, said Dretler. The vendor and the user should review the project plan and adjust it as the resource needs and time constraints of the user require.

Effective project management of an implementation is important because most communications departments have very tight staffing constraints. A sound project plan will make clear how much work has to be done, by whom, the available staff resources and the time frame in which the user wants it done. With that information, the user can see what trade-offs have to be made to meet the organization's priorities, Dretler explained.

Users typically underestimate the importance of the sixth step, which involves data collection and input, because of its clerical nature, he said. But this information on equipment, users, locations, departments and so on is vital to any management system's data base. The job of accurately inputting this data almost always takes longer and requires more people than at first expected, he said.

Staff considerations

The seventh step focuses on staff considerations. Automating jobs that have been done manually creates important shifts in staff functions, Dretler explained. Careful planning can pinpoint where and how those changes will occur, allowing managers to shift staff into more productive jobs that call for analytical and problem-solving skills that weren't needed in clerical-type jobs, he said.

Users should not expect network management systems to cut staff, he said. Rather, staff growth seems to slow down and productivity increases.

The final step focuses on cost-justification of the control system to senior management. Costs will cover the system itself, onetime charges for such things as staff overtime incurred during implementation and ongoing costs for software maintenance, vendor support and so on.

The study recommends breaking savings into two classes: hard dollars associated with reduced manual preparation of directories, bill reconciliation and so on, and soft savings for higher network availability and increased responsiveness to change and user problems.

Dretler said that the savings incurred from implementing network management are typically much larger than users expect for the simple reason that the real costs of not having network management are deeply hidden.

One Info Group customer, a large bank, expected to save about \$50,000 the first year after implementing a relatively small ATMS system. One year later, Dretler said, the bank documented actual savings of \$400,000.

"The net result is people are getting less than one-year paybacks on these systems when they are implemented effectively," he said. □

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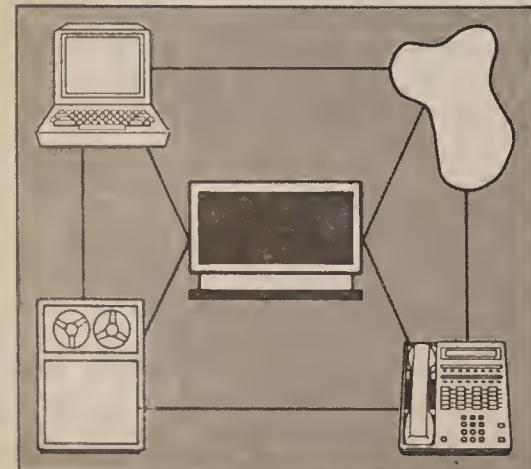
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Scientific-Atlanta offers shared X.25 net service

Skylinx.25 lets VSAT users share network hub.

By Rex Bowman
West Coast Correspondent

ATLANTA — Hoping to cash in on what it sees as growing acceptance of very small aperture terminal technology, Scientific-Atlanta, Inc. has begun offering a shared X.25 network service.

Dubbed Skylinx.25, the service lets VSAT users share Scientific-Atlanta's network hub — a 7-meter Ku-band satellite dish — to support two-way communications between sites via a General Electric Co. K2 satellite. Although users have to buy VSATs from Scientific-Atlanta, they can now avoid the high cost of setting up a master hub.

The service is targeted at businesses throughout the Southeast.

The offering marks a shift in strategy for Scientific-Atlanta, according to William Hogan, marketing manager of the company's Network Systems Group. For 30 years, Scientific-Atlanta

tween its retail stores and mainframes in Los Angeles and Atlanta. The company had previously linked its retail stores to the mainframes via leased terrestrial lines.

According to Hogan, the satellite can easily accommodate more than 1,000 VSATs, although Scientific-Atlanta needs to put only 250 to 350 VSATs on the network to make it a profitable venture. The company has invested \$1 million in the Atlanta hub and operations center, Hogan said.

While not disclosing the terms of the The Home Depot agreement, Hogan said future pricing for the Skylinx.25 service could include a flat fee per VSAT and a

monthly charge based on traffic volume.

Although Scientific-Atlanta is originally targeting businesses in the Southeast as potential users of the service, Hogan said any business in the country could use the Atlanta hub because the satellite can transmit to any site in the continental U.S.

Hogan said the service also provides growing businesses with a more gradual method of buying their own satellite-based net-

work. "If you're a company with 80 sites, you probably wouldn't want to build a \$1 million hub for yourself," he said.

"Once you've got 300 or 400 VSATs using our hub," he added, "you may find it cheaper to put in your own hub and point it at the satellite."

Skylinx.25 uses X.25 protocols and allows two-way voice, data and video transmission between VSATs and the satellite at 56K bit/sec. □



By offering the service, the company is hoping to reach smaller businesses that want to use VSATs without buying their own nets.

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sold satellite communications equipment used in private networks. Now, by offering the shared network service, the company is hoping to reach smaller businesses that want to use VSATs without necessarily buying their own VSAT networks.

"We realized that if we're going to be a major player in the VSAT market, we have to not only service larger customers that buy their own VSAT networks, but offer these shared network services," Hogan said. "This service allows us to reach the companies with fewer sites, although they're not necessarily the smaller companies."

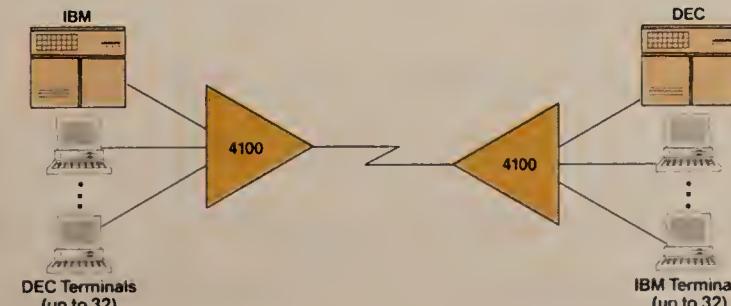
The hub site outside Atlanta is also the location of a network operations center, where Scientific-Atlanta will monitor users' networks. The company is currently building another shared network hub in Los Angeles, scheduled to be operational in early 1989, and plans to build more hubs in other major U.S. cities.

Scientific-Atlanta has already signed up its first customer on the Atlanta shared network. The Home Depot, Inc., a hardware chain based here, bought 85 VSATs from the company and is using them to transmit data be-

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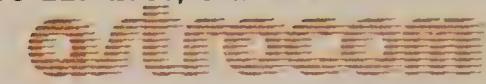
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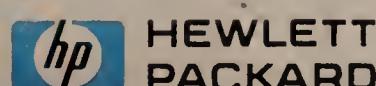
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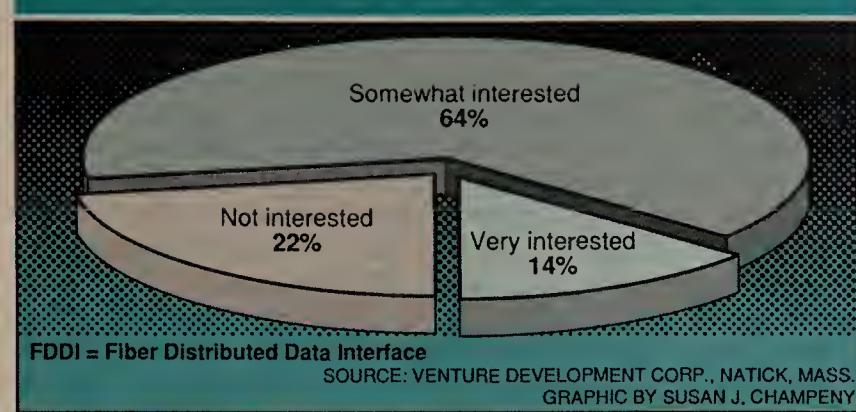
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Worth Noting

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Network General unveils LAN protocol analyzer

Series PA-500 improves speed, performance.

By Laura DiDio
Senior Editor

MOUNTAIN VIEW, Calif. — Network General Corp. last week announced an Intel Corp. 80386-based local network protocol analyzer and several enhancements to existing products.

The new 386-based hardware platform, called the Series PA-500, a portable 386 Sniffer, offers significant improvements in speed, performance and memory capacity (as much as 8M bytes) over Network General's earlier Intel 80286-based Series 300 and 400 versions, according to company president Harry Saal.

The PA-500 can complete a seven-layer protocol analysis of a 50,000-packet data frame in less than 30 seconds.



The Series PA-500, which incorporates a new software release, called Version 2.0, can complete a seven-layer protocol analysis of a 50,000-packet data frame in less than 30 seconds. A 1,000-packet data frame takes less than one second to analyze.

For network managers, however, the most obvious and helpful feature of the latest device is its use of color to analyze protocol layers of the International Standards Organization (ISO) Open Systems Interconnection model. This lets net managers make an at-a-glance analysis.

Color helps the user see the ratio of network application activity to network overhead, which includes things such as acknowledgments, Saal said. "A network manager will be able to look at the screen from across the room

and determine whether his net is bogged down with too many users and not processing data.

"The bottom line for network managers and investigators is performance and ease of use," Saal continued. "And these new features deliver answers faster and keep the corporate network up and running without costly or debilitating downtime."

The complete single-network Series PA-500 Portable 386 Sniffer includes a Compaq Computer Corp. Portable 386, one Sniffer add-on Interface Module and the Version 2.0 software. Optional Protocol Interpreter Software may be installed.

The price of the PA-500 Sniffer, including hardware and software, is \$24,000. The Version 2.0 software is standard in all new shipments.

The price for upgrading existing Sniffers to the new software is \$50.

Concurrently with the release of the PA-500 Sniffer, Network General expanded the capacity of the Series PA-300 and PA-400 protocol analyzers.

Packet buffer memory size for both the Series PA-300 and PA-400 has been increased, enabling both devices to capture more packets in each sample. "This is a key element in troubleshooting and fine-tuning LANs," Saal said.

Specifically, the Series PA-300, which is used to analyze homogeneous networks such as Ethernet, IBM Token-Ring and AT&T Starlan, now supports a maximum of 3M bytes of buffer memory, up from 256K bytes.

The Series PA-400, which also supported a maximum 256K-byte buffer, can now be upgraded through a memory option to 1.5M bytes. The Series PA-400 is aimed at users of heterogeneous nets "who don't need to analyze more than two different types of networks together, such as Ethernet and Token-Ring," Saal said.

Network General also introduced an entry-level version of

(continued on page 29)

NETWORK WORLD • SEPTEMBER 26, 1988

Amdek Corp. has introduced an optimized version of Microsoft Corp.'s OS/2 operating system software for its Intel Corp. 80286- and 80386-based personal computers and compatibles.

According to Amdek President Lawrence Lummis, Amdek decided to support the

(continued on page 29)

NetWorld 88 to host product premieres

More than 200 vendors are expected to display their wares; several preview upcoming offerings.

By Paul Desmond
Staff Writer

DALLAS — More than 10,000 visitors are expected to descend upon the Infomart here tomorrow for NetWorld 88, a three-day networking show at which more than a dozen vendors will unveil new products.

Now in its third year, NetWorld has seen an almost 400% increase in attendance since its first year, according to H.A. Bruno, Inc., the show's producer. The show's sponsor, Novell, Inc., calls it the computer industry's largest local networking-specific event and said the show will focus on more than just NetWare-compatible products. Previous NetWorlds were geared only to NetWare systems.

Vendors apparently consider the show important, since exhibit space was sold out three months ago. More than 200 vendors will exhibit their wares, and almost 20 have scheduled press conferences, many to introduce new products. Although a few vendors were close-mouthed about the

content of their announcements, many vendors offered product information to *Network World* in advance of the show.

All vendor booths will be linked by a 400-workstation local network built by Novell and SynOptics Communications, Inc. Running under Novell's SFT NetWare Version 2.12 operating system, the network will allow exhibitors to store any compatible software applications on file servers that can be accessed from any network workstation.

For attendees seeking a break from the product exhibits, the Networld 88 Seminar Series will offer 33 educational and discussion sessions at different times throughout the show.

Product introductions

Crystal Point, Inc., the Kirkland, Wash.-based supplier of asynchronous communications products for the IBM Personal Computer market, will unveil what it claims is the first multiuser bulletin board for local net-

(continued on page 28)

LANMARKS

BY STEWART NOWAK

A shopping guide to LAN power supplies

The critical applications many local networks support today make quality power protection a virtual necessity. Without it, local network environments are vulnerable to power problems that can result in lost data, erroneous information, damaged hardware and premature component failure.

Many manufacturers are, in fact, making complete power protection a provision of their service contracts. Unfortunately, shopping for power protection can be confusing. With virtually no production standards or legal regulation, a plague of conflicting claims and dubious product information has spread across the industry.

Various devices are available that attempt to remedy the problems of transients, surges, spikes, blackouts and brownouts, which are sustained periods of below 102 volts. These devices include surge and spike suppressors, isolation transformers, voltage regulators, line conditioners and uninterruptible power systems (UPS). Each of these devices combats specific power problems; however, only a UPS is designed to continue producing power during a blackout. A well-designed UPS incorporates the protective features of each of the other individual devices.

UPSs can be divided into three basic types: off-line UPSs, hybrid UPSs and on-line UPSs. All three have an internal battery that produces alternating current power via an inverter. How and when this inverter comes into play largely determines a

(continued on page 92)

Nowak is power products sales manager for Clary Corp. in San Gabriel, Calif.

NetWorld 88 to host product premieres

continued from page 27

work users. Dubbed Yak, the software program allows up to 16 users to simultaneously read or enter both public and private messages.

The software runs on a dedicated local net server, so it does not consume network resources, such as memory, or reduce operating speeds. Yak requires PC-DOS 3.3 or later and an IBM Personal Computer or compatible with a 20M-byte hard drive on an IBM Network Basic I/O System-compatible, AT&T, Ungermann-Bass, Inc. or Zenith Data Systems network.

OmniTel, Inc. of Fremont, Calif., will introduce four local networking products at NetWorld. The products include a four-port serial communications card, a net-

work version of its Bitcomm communications software and new features for its Asynchronous Communications Server (ACS) gateway software.

ACS software runs on any IBM NETBIOS local net workstation and allows users to access any internal or remote asynchronous service.

ACS upgrades include support for IBM Personal System/2 workstations, support for data communications speeds up to 19.2K bit/sec and the ability to let users vary configurations of OmniTel's line of modem cards and its V-Com cards. OmniTel's Q series modem cards can support up to four modems on a single board.

OmniTel will also introduce a new package of products it calls an Asynchronous Gateway Starter kit. The kit is a hardware and software package that gives NETBIOS network users a gateway to access any re-

mote asynchronous network or service. Since it is designed to introduce users to OmniTel's gateway products, the company will offer the kit at a 25% discount.

IMC Networks of Tustin, Calif., will use NetWorld to announce the expansion of its Ethernet product line with PCnic 8bit, an Ethernet interface card designed for IBM Personal Computer XT, AT and bus compatibles. Along with its sister 16-bit interface cards, PCnic and PCnic II, the new card is designed to let users with installed local nets running on 75-ohm or 93-ohm coaxial cable upgrade to Ethernet with only minor cabling modifications.

PCnic 8bit works with NetWare and requires a block of eight I/O addresses.

At least two vendors will announce value-added process (VAP) products for NetWare. VAPs are third-party improvements to existing products.

LAN Systems, Inc. of New York will announce the first shipments of its LANSpool print server program for Novell networks. Although the product has been previously announced, it will begin shipping during NetWorld. LANSpool allows users to attach multiple printers to any device running under NetWare Version 2.1.

Emerald Systems Corp. of San Diego will showcase its new Tape Backup Server, also developed as a VAP for NetWare Version 2.1. Designed to work with Emerald's 2.2G-byte Virtual Archival Storage Technology Device tape backup system, the company's Tape Backup Server can provide backup to network data and to local disk volumes throughout the network.

EmSave, Emerald's data backup utility that lets network managers load and recover network server files automatically, will be shown for the first time at NetWorld. Announced last month, EmSave operates on Emerald's new RapidRecover series of cartridge and cassette tape backup subsystems.

The RapidRecover series will also be demonstrated at NetWorld. The series includes 1/2-in. and 1/4-in. tape subsystems with storage capacities ranging from 60M to 300M bytes. The RapidRecover series features an error-correction coding scheme designed to compensate for any cassette or cartridge defects.

"For example, during a backup, if damaged areas are detected on the tape media, RapidRecover overcomes errors by moving the tape forward and writing on the next available certified spot, rather than rejecting the cartridge and aborting the backup operation," said Michael Harris, Emerald's product marketing manager.

To help users keep track of all the products they will see at NetWorld and elsewhere, Interconnect Data Systems, Inc. of Anaheim, Calif., will introduce its new data base of installation guides, product compatibility information and explanations of error messages and conditions for hundreds of personal computer networking products from a wide array of vendors. The Technical Encyclopedia of Computer Hardware and Software (TECHS) is shipped on floppy disks, which users must transfer onto a hard disk.

To keep current, TECHS subscribers receive monthly floppy disks that contain updates to the data base.

User-oriented seminars

In addition to the various vendor announcements and ongoing product demonstrations at the show, NetWorld will also feature a series of seminars that users are invited to attend.

On Tuesday at 12:45, Mark Freund, vice-president of Interconnect Network Consulting Group, will lead a panel discussion entitled "Planning Corporate Networks." The discussion will focus on issues managers face in developing their networks, such as utilizing current investment in products, manageability of standards and providing for growth.

A seminar titled "LAN Management and Troubleshooting" will be held on Wednesday at 2:45. Attendees can discuss with a panel of vendors and users the hurdles to be overcome when managing a local net.

On Thursday at 2:45, NetWorld attendees can opt for a seminar on gateways and bridges or a seminar called "Fine-Tuning Networks." The latter will teach managers how to improve net performance and reliability with minimal additional cost. "Gateway Comparison Testing and Bridges," meanwhile, will describe the differences between these products and discuss methods of evaluating them.

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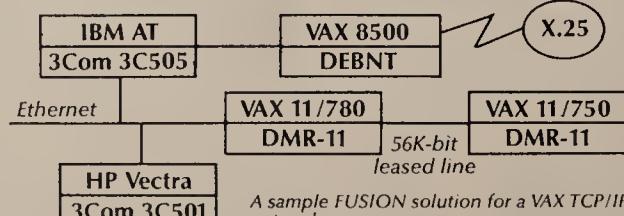
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DSC software ups throughput, runs in 80386 protected mode

By Laura DiDio
Senior Editor

SANTA CLARA, Calif. — DSC Communications Corp. will introduce at the NetWorld 88 show this week a new version of its NEX/OS operating system software that runs in the Intel Corp. 80386 protected mode and improves data throughput by as much as 500%.

This latest version of NEX/OS, which is Network Basic I/O System-compatible, also runs PC DOS 3.1 and 3.3 and Novell, Inc. NetWare applications. The earlier version of NEX/OS emulated only an 80286-based Personal Computer AT.

The newest NEX/OS is designed expressly for large corporate local nets of 50 to 100 nodes, according to Mark Fowler, senior vice-president of DSC's Business Network Systems Group and general manager of the Local Network Division.

By operating in the protected or native mode of the 80386 chip, NEX/OS overcomes the 64K-byte memory limit of earlier microprocessors. This enables as much as 4G bytes of memory to be addressed, which increases performance.

"LANs will continue to grow outside of their present parameters," said John Stafford, director of marketing for the Local

Network Division. "We need this 386-based operating system and the performance it provides as a platform for the wide-area networking communications we will bring to users within the year."

DSC, Stafford said, is targeting corporate users who wish to connect remote offices with corporate headquarters to distribute host computing resources. Local net users currently cannot update remote data bases easily, Stafford said, because it takes eight minutes to update one record.

"NEX/OS, with its data base engine capability, lets users process records at the file server rather than at the workstation. Instead of uploading an entire file into a workstation, the user can make the updates at the workstation and send them over the network to the file server for processing," Stafford said. "The result is reduced network traffic between the remote

location and the server, so the same eight-minute record update will now only take a few seconds."

Specifically, he claimed, NEX/OS increases throughput on data base applications by as much as 500%. This is accomplished by processing index records at the server rather than at the workstation. "The result is that network traffic is dramatically reduced," Stafford said.

DSC's NEXOS product line includes the NEX/OS multitasking operating system, network interface cards, 80286-based network workstations, 80386-based file servers with real-time tape backup and a variety of communications gateways.

NEX/OS has a list price of \$3,295 and is scheduled to ship early next month.

For further information, contact DSC at 3101 Scott Blvd., Santa Clara, Calif. 95054, or call (408) 727-3101. □

Netnotes

continued from page 27

emerging OS/2 standard now "because we feel the importance of OS/2's multitasking capabilities for such things as background communications and data retrieval will soon be reflected in a flood of new applications." OS/2's multitasking capability allows a single user to run multiple OS/2 applications concurrently. Because most MS-DOS applications can be run under OS/2, Amdek personal computer users can easily migrate to the new OS/2 Version 1.0 operating system, the company said.

Amdek has fine-tuned its OS/2 Version 1.0. Software drivers have been written to support Amdek-specific features, such as the 16-character LCD that shows date, time, CPU speed and disk access. In addition, OS/2 Version 1.0 has a dual-booting feature that allows users to boot to either MS-DOS or OS/2.

Amdek Microsoft OS/2 Version 1.0 is available now and has a list price of \$325.

Howard Salwen, chairman and founder of Proteon, Inc., has been elected to the board of directors of Telco Systems, Inc. Norwood, Mass.-based Telco Systems designs and manufactures digital fiber-optic transmission systems and digital multiplexing equipment.

Salwen, who is generally credited with inventing token-ring passing algorithms, will continue as Proteon chairman. □

Network General unveils LAN analyzer

continued from page 27

the PA-500, priced at \$12,500. The product comes with hardware and software that customers can integrate into existing 386-based microcomputers.

The firm also last week released its first Laptop Sniffer designed solely for IBM Token-Ring Networks, the Model PA-301. It costs \$15,750 and includes hardware and software. Saal said the company expects to announce support later in the year for other baseband, broadband, fiber-optic and high-speed networks, such as Fiber Distributed Data Interface-compatible nets. Network General also plans to offer a version of the Sniffer for IBM's 16M bit/sec Token-Ring when it is available.

The new hardware platform and the Version 2.0 software will begin shipping the first week in October.

For more information, contact Network General at 1945A Charleston Road, Mountain View, Calif. 94043, or call (415) 965-1800. □

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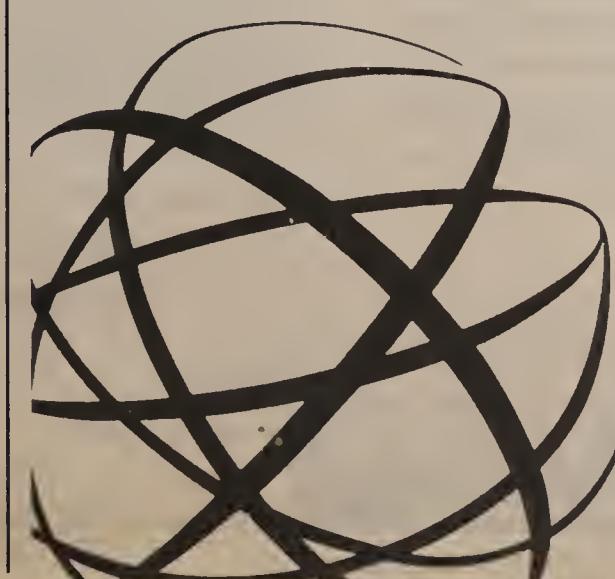
The 4142TCX, the world's first 14,400 bps modem with full duplex, single dial back-up, has redefined state-of-the-art. It's faster and more efficient than any other dial-up modem, and it's available today from BT Datacom, a member of the British Telecom group of companies.



The 4142TCX pictured here with an 8 channel Stat Mux

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Communications Engineer,
Department of
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Network World and The Computer Channel, Inc. (CCI) will present a live, televised, interactive seminar on Integrated Services Digital Network on Oct. 21. For more information, call CCI at (516) 352-9490.

Dialogue

Do you agree with the Federal Communications Commission's decision to let AT&T move ahead with its proposed Tariff 15?

C The decision is a good one. It will make the industry more price-competitive and more fair.

"MCI and others can break the tariffs with impunity, and AT&T can't. Of course, the FCC would want to provide some umbrella protection for AT&T's competitors. Because AT&T historically has dominated the industry, it would be easy for AT&T to knock everyone else out of business."

Patrick O'Haren

Vice-president of computing and telecommunications
National Semiconductor, Inc.
Santa Clara, Calif.

C I am concerned about the long-term implications of any tariff change. The [FCC ruling] is a good thing in the short run, but the long-term results depend on how well the FCC controls the process. The FCC needs to protect the consumer from predatory pricing and cross-subsidization practices by the carriers.

"If those things are controlled, then Tariff 15 is a good thing."

Lionel Gillerman

Manager of network technology
McDonnell Douglas Aerospace Information Services Co.
Cupertino, Calif.

C With Tariff 15, AT&T can pick and choose what pieces of its business it wants to retain. It allows AT&T to structure a specific deal for its most valuable customers. Smaller companies would be overlooked and not get to take advantage of pricing

(continued on page 36)

Executives surveyed about info systems

DEC-sponsored study examines how senior executives feel about information technology.

By Wayne Eckerson
Staff Writer

NEW YORK — Nearly three-quarters of the senior executives at major U.S. corporations said they believe information systems can provide a strategic advantage, according to a recently released survey commissioned by Digital Equipment Corp.

In addition, more than 80% of executives believe networks play a critical role in supporting their international operations. Nearly 70% of the executives interviewed added that information systems are helping them expand their enterprises abroad.

The survey, entitled "Managing Change: An Executive Perspective on the Enterprise-Wide Impact of Computer Technology," summarizes the responses of chief executive officers, chief operating officers and strategic planners from leading companies.

It was conducted for DEC by the Roper Organization.

The survey measured the perceptions of senior executives about the value of information technology and its use as a strategic weapon. The study also examined how information systems are contributing to the restructuring of management hierarchies.

Executives interviewed came from companies in many industries, including aerospace, automotive, chemical and pharmaceutical, electronics, finance and insurance, food and beverage, oil and gas, pulp and paper, telecommunications and utilities.

Starting dialogue

"The survey was a starting point for a dialogue among senior executives about how their companies can best use computer technologies to achieve business objectives," said Edward Kamins, corporate communications manager at DEC.

The results of the survey were (continued on page 32)

GUIDELINES

BY ERIC SCHMALL

The politics of management

Effective communications managers regard their roles in much the same way as political candidates.

Success in either field depends on identifying the various audiences served, knowing how to appeal to their interests and translating their needs into action.

A political candidate will be elected if his or her strategy is based on an accurate perception of the different groups that make up the electorate. The candidate tailors programs that match these groups' interests.

A communications manager who fails to distinguish the various segments of his or her "public" is headed for considerable trouble.

Who does the manager serve? First is management, which directs and evaluates the manager's performance. Keeping the boss happy is of fundamental importance.

But satisfying this requirement alone does not assure success as a communications manager. Users — the people who rely on voice, data or image systems — have to be given top priority. A communications manager who tries to placate superiors without regard to user satisfaction cannot succeed.

Users can be considered the political equivalent of voters in this analogy. While all users, like all voters, share common concerns, it's critical to recognize that there are differences in their needs.

Some groups in an organization are more dependent on voice network facilities to perform their duties. Some require local access; others need extensive outbound toll-facility access. A customer service group is heavily reliant on 800 services and automatic call distribution operations. An investment group needs specialized ring-down circuits providing instant access to (continued on page 36)

Users split on deregulation

Respondents were asked whether they agreed or disagreed with the following statement:
There is too much regulation in the telecommunications industry.



SOURCE: MAY 1988 WALL STREET JOURNAL SURVEY OF INTERNATIONAL COMMUNICATIONS ASSOCIATION MEMBERS, NEW YORK GRAPHIC BY SUSAN J. CHAMPEY

SABRE network software glitch costs airline \$50m

Reservations mishandled due to logic error.

By Barton Crockett
Senior Writer

NEW YORK — A flaw in American Airlines, Inc.'s Semi-Automated Business Research Environment (SABRE) reservation network cost the carrier nearly \$50 million in lost ticket revenue, company officials disclosed recently.

The revelation was made at a meeting of airline industry analysts here earlier this month. At the meeting, executives from the Fort Worth, Texas-based carrier said a logical error in a SABRE software program, dubbed Dynamo, caused open seats to be listed on the network as closed.

American Airlines installed the software last spring.

"Everyone in the company was really excited about Dynamo," said John Hotard, a company spokesman. "Unfortunately, there was a glitch. The system stopped selling discount fares before they ran out. We figure this cost us \$50 million in ticket money we would have otherwise collected."

Dynamo was designed to automate a task called yield management. Through yield management, which is widely practiced in the airline industry, fares are modified over time, depending on demand, to ensure that flights carry the highest possible number of passengers. When demand for a flight is low, for example, more discount fares are offered. If demand is high, the number of discount fares is limited.

Prior to development of Dynamo, yield management was handled by people analyzing data retrieved from the SABRE network.

Initially, the airline implemented Dynamo to handle yield management for low-traffic routes. American Airlines executives hoped Dynamo would save time and money filling seats on relatively minor routes. By late

summer, however, Hotard said, the airline realized that something was wrong.

"We looked at the number of people on our planes, and there simply weren't enough," he said. "Our percentage of seats filled was one, two, even three points below our competitors and our own predictions."

Hotard said Dynamo failed to offer a greater number of discount fares when demand for more expensive business-class fares was low. Since other airlines were dropping their rates for business-class seats, travelers simply flew with them instead.

"A traveler would have a choice of, say, a \$300 seat on American and one for \$119 on Delta [Air Lines, Inc.]," he said. "Obviously, they chose Delta."

Hotard said American Airlines executives initially blamed declining air traffic for lower-than-expected passenger levels. This idea was quickly discarded, however, when the executives realized that competitors were not experiencing a similar shortage of travelers.

He said American Airlines executives began to worry that the airline's quality of service was faltering. This theory was dropped, however, when an investigation turned up the software glitch.

With the software problem exposed, Hotard said, the company moved quickly to resolve it. Within a few days, he said, Dynamo was modified, and it was filling seats in the manner the airline had expected.

Hotard insisted that the multi-million-dollar software bug had not spoiled the airline's faith in automation.

"This company believes in computerization, and we've made a great reputation for ourselves in that," he said. "This one problem won't set us back." □

Executives surveyed

continued from page 31

discussed by a four-person panel moderated by ABC anchorman Ted Koppel. About 750 executives attended the program held Sept. 14 in New York, and more than 1,000 executives watched via closed-circuit television at 10 DEC locations across the country.

Panel members were Michael Hammer, founder of Hammer and Co.; John Naisbitt, manage-

ment consultant and author of the best-selling books *Megatrends* and *Re-inventing the Corporation*; Peter Sprague, chairman of the board of National Semiconductor Corp.; and Alberto Vitale, president and chief executive officer of Bantam, Doubleday, Dell Publishing Group.

The survey showed that 42%

of the executives believe U.S. companies are ahead of foreign companies in acquiring and implementing computer technology. But only 14% of the executives said computer technology is significantly helping their companies penetrate markets abroad.

In contrast, 50% of the respondents said computer technology is helping foreign companies penetrate U.S. markets.

"For most U.S. companies, computers still serve a back-

room function," Kamins said. "My hunch is that clever, enterprising foreign companies are using computer technologies more aggressively than U.S. companies to win new markets."

The survey showed that 70% of U.S. executives said their companies view information systems as a strategic resource. However, 68% of executives said computers provide the greatest advantage in controlling costs, the most fundamental back-room operation, ac-

cording to Kamins. Twenty-eight percent of executives reported that they view computers primarily as an overhead cost.

About one-quarter of the executives said information systems aid in managing change, developing new products and integrating and identifying new business.

Kamins said the executives often complained that the competitive advantages they have gained by using computers have been short-lived.

"Computer technologies can give companies a sustainable competitive advantage only if executives make computer technology an integral part of their business strategy," he said.

Kamins said the panel spent considerable time debating the effectiveness with which U.S. companies are using computers as a strategic resource rather than as a back-room support operation.

The panel debated whether U.S. executives fully understand how to wield computer technol-

“For most U.S. companies, computers still serve a back-room function," Kamins said.



ogy for competitive advantage, especially in global markets, according to Kamins.

Impact on management

The survey also revealed that computers are changing the way top managers make decisions.

Eighty-three percent of the executives said information systems have generally improved their professional decision-making abilities. Roughly the same number of executives said they use computer-generated information to make both strategic and operational decisions.

The amount of money executives said their companies are spending for computer products supports these views. Thirty-nine percent of the executives reported that their company spends more than 5% of the operating budget on computer technology, a figure greater than the amount of money most companies spend on either advertising or research and development, according to industry averages.

Companies that are spending more money on computers and communications and making the technology available to more people in their operations are also seeing information systems influence organizational structures. Almost one-third of senior management said computer technology has decreased levels of hierarchy in their corporation. Seventeen percent said that computers increased the levels of hierarchy. □



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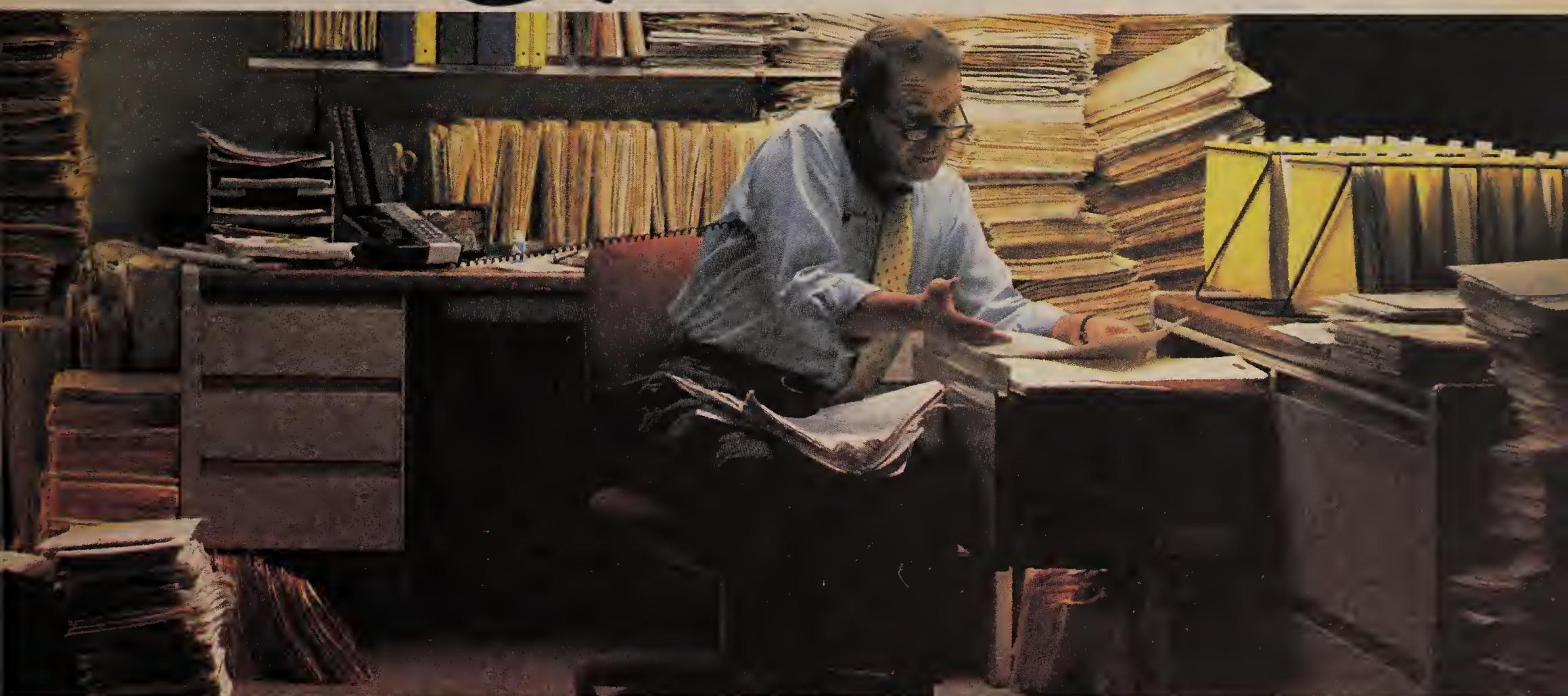
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The politics of management

continued from page 31

financial markets.

Some groups may be host-dependent or critically tied to other department data bases via local-area networks. Some groups need voice mail to enhance their productivity; for others, electronic mail is more effective.

Policies and agendas

A modern political candidate has to formulate a set of policies that addresses issues as diverse as agriculture, urban development, defense and health care.

The communications manager has to develop an equally wide-ranging agenda. House wiring, toll services, protocols, vendor selection and integration of voice/data services represent just a few. The sum

of all approaches on these topics must be merged into a coherent communications strategy.

By adhering to this strategy, the manager meets diverse user needs while avoiding internal conflict.

The downside of both a politician's and a technical manager's lot stems from the conflicting demands of their respective publics. A communications manager faces "guns vs. butter" decisions in the apportionment of research time, systems improvements and upgrades, and in the introduction of new systems.

Balancing current system management while acting as a midwife for emerging technologies presents a challenge.

In listening to various groups' requests

for network advice, the experienced manager also recognizes a variety of parochial interests among users, who want systems or solutions that rarely match current protocols, standards, speeds or network capabilities.

Building a consensus

This challenge provides the greatest opportunity for success in both telecommunications and politics.

The individual who can translate various groups' needs into an integrated set of solutions achieves consensus-builder status.

The successful manager synthesizes the needs expressed by these groups with his policies and programs. He enlists the support of the various groups by pointing out the potential rewards his solutions offer. □

COS set to open conformance test laboratory

By Barton Crockett
Senior Writer

MCLEAN, Va. — The Corporation for Open Systems (COS) this month is opening its first public laboratory where users and vendors can test computer and networking products for conformance to Open Systems Interconnection standards.

The interoperability laboratory is housed in an 800-sq.-ft. room in COS headquarters here. COS has wired the laboratory so users and vendors can link processors over a variety of networks. COS will also provide testing tools that will allow companies to determine how well products conform to OSI protocols.

"We built this because of the interest expressed by people at the [Enterprise Networking Event '88 International] in having such a facility," explained Vincent Rocanova, marketing operations director for COS. "The lab should give us good feedback for further refining our conformance testers."

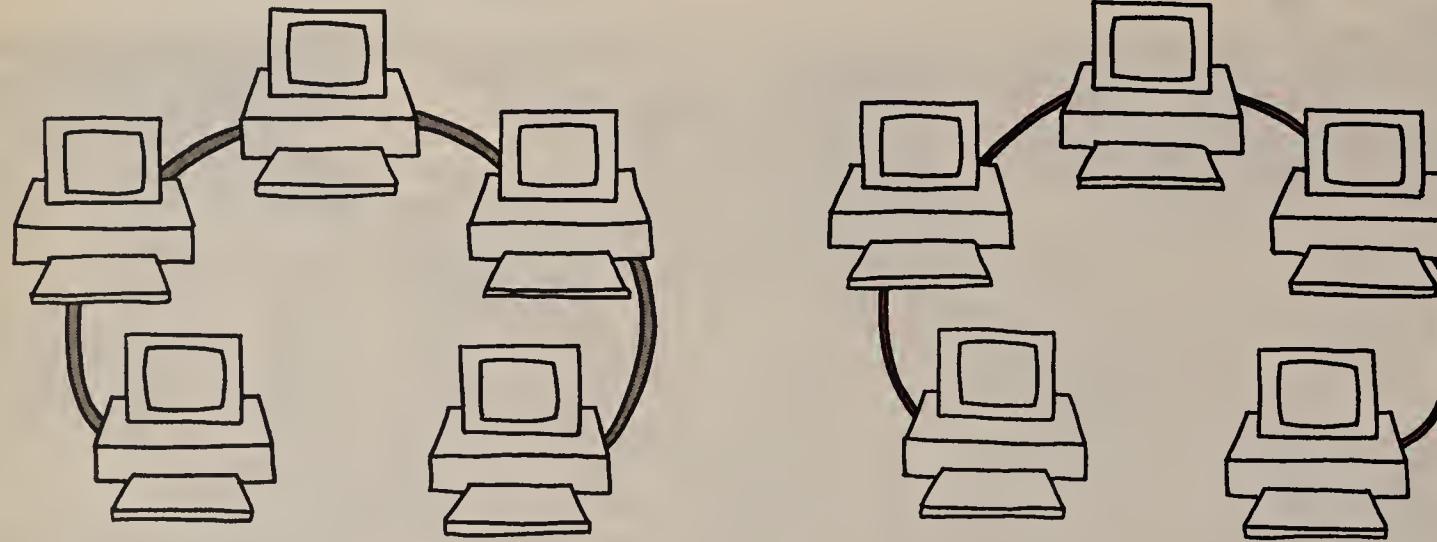
Rocanova said the lab will be operated on a trial basis for the next six months. During this time, he added, COS will see how much demand develops for the facility and how useful it is for COS. If it is deemed a success, COS will make the lab permanent. COS may even ask vendors to donate computer equipment that will be permanently housed at the site.

According to Rocanova, the laboratory is the first such facility supported by COS. While the nonprofit organization maintains private labs for testing how well individual products conform to OSI, Rocanova said no such facility exists for testing of large networks of computers. Such conformance testing, he said, is primarily done at user sites.

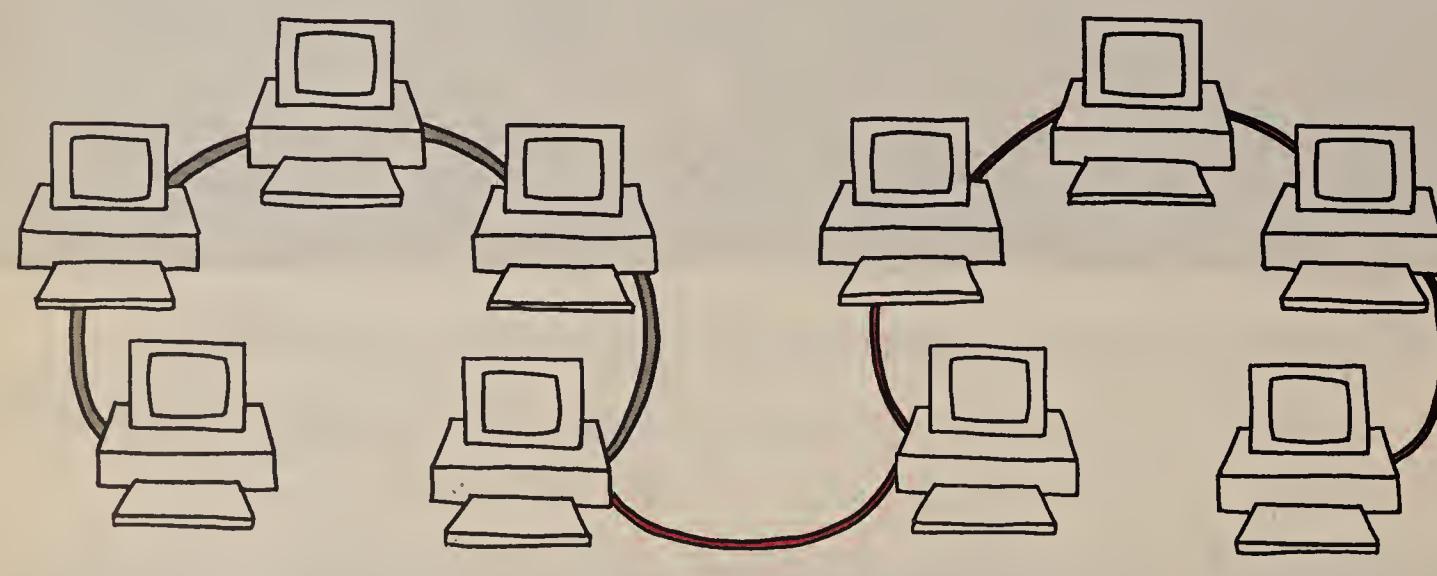
One result of this is that the conformance testers may not accurately measure how well machines work when linked to a variety of other machines in an OSI net.

"Measuring OSI networks in a user site doesn't give nearly as good feedback as you can get in a laboratory," he said. "The mix of machines at user sites is much more limited. In a lab, you can link up an extremely diverse set of machines."

Currently, six vendors have signed up to use the facility, but no users have signed up. Rocanova would not disclose the names of the companies involved. He said that users or vendors wishing to use the facility should contact COS. □



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Dialogue

continued from page 31

discounts. Also, Tariff 15 would hurt US Sprint and MCI.

Lee Kleinman
Manager of
telecommunications
Red Roof Inns, Inc.
Hilliard, Ohio

" It is unfair to expect AT&T or any other company to survive in a competitive marketplace if it is not allowed to compete. It shouldn't have its hands tied."

Ruth Michalecki
Director of
telecommunications
University of
Nebraska at Lincoln

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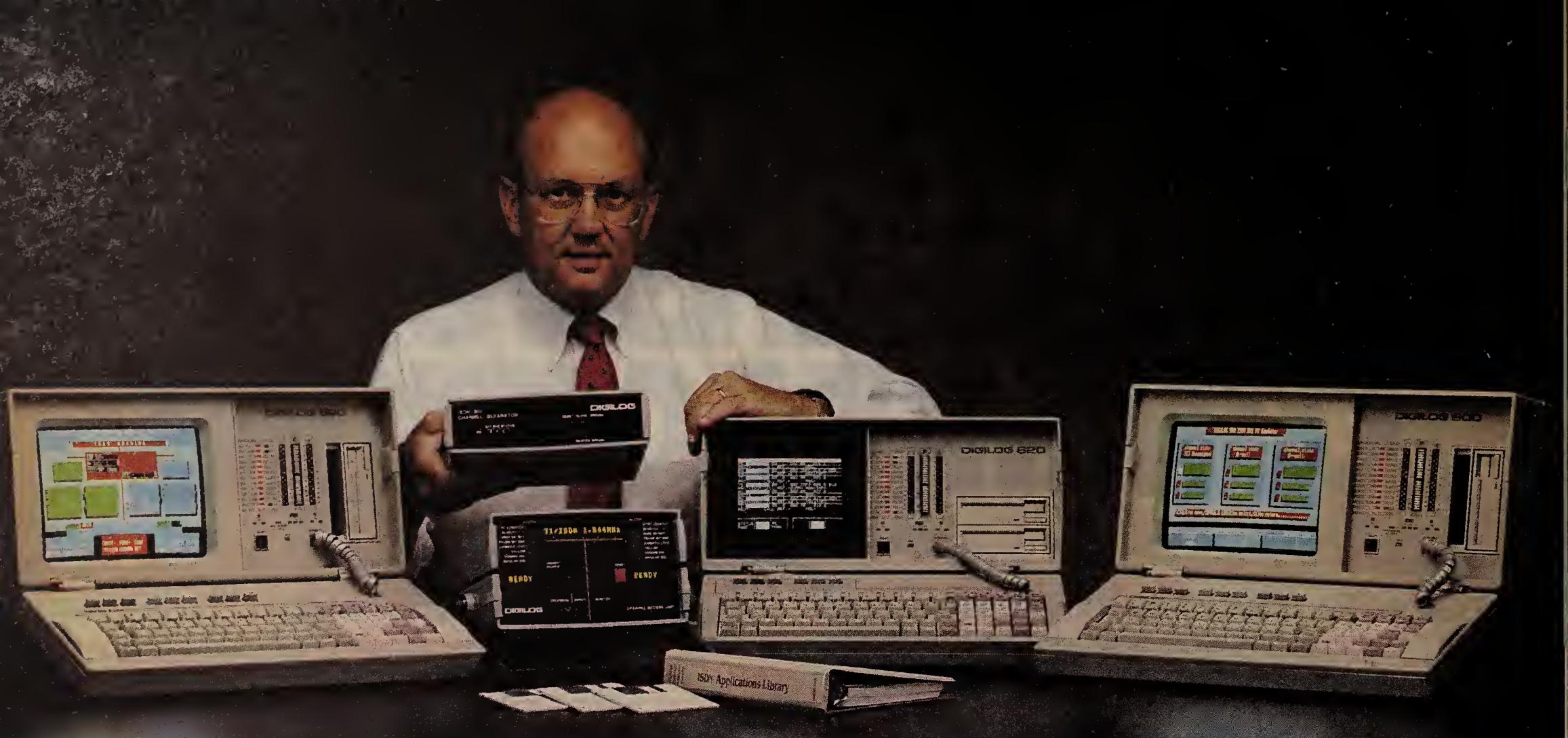
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See inside for:

- V.32-compatible 9.6K bit/sec modem from Fastcomm
- Votrax Desktop voice-response unit for automobile dealers

First Look

Software eases DEC E-mail transmission

Process Software Corp. recently unveiled software that enables users of Digital Equipment Corp. VAX, Micro-VAX and VMS computers to exchange electronic mail with computers supporting TCP/IP protocols.

Called **SMTP-VMS**, the software works with DEC's VMS Mail Utility to send, receive and store messages across local- or wide-area networks.

SMTP-VMS uses the same commands and messaging formats as DEC's VMS Mail Utility, and like VMS Mail Utility, it automatically notifies users of incoming or undeliverable mail and defers delivery to unavailable computers until they are available.

SMTP-VMS works in conjunction with DEC Ethernet controllers. The software is supported by DEC's VMS 5.0 operating system and is installed using DEC's VMS-INSTAL software program.

Systems managers can set parameters on SMTP-VMS that determine the time intervals that incoming messages are checked and delivered as well as the amount of time a message is saved in computer memory.

A Unix socket library is also provided to support the stream and datagram socket functions, which are commonly used Unix system calls.

The product is available now and costs \$795 for a MicroVAX II version. Prices vary for other DEC VAX systems.

Process Software Corp., 35 Montague Road, P.O. Box 746, Amherst, Mass. 01004, or call (413) 549-6994.

(continued on page 42)

DCA betters X.25 PADs, adds model

By Jim Brown
New Products Editor

ALPHARETTA, Ga. — Digital Communications Associates, Inc. (DCA) recently enhanced its Digital Packet Exchange (DPAX) X.25 packet assembler/disassemblers and introduced a new PAD.

Both the DPAX 1100 and DPAX 2100 Version 2.01 support dual, synchronous X.25 trunks, each of which operates at 72K bit/sec. On the local side, the DPAX 1100 has 64 ports supporting connection of asynchronous terminals and minicomputers. The DPAX 2100 has 80 ports.

Local devices can communicate with a DPAX at up to 19.2K bit/sec via 50-pin connectors, and a DPAX connects to trunks via RS-232-D, V.35 or V.11 interfaces.

Both the DPAX 1100 and the DPAX 2100 concentrate asynchronous data for transmission over a private or public X.25 network. Both units link to the X.25

net via synchronous trunks capable of forwarding 200 packet/sec. The trunks can be configured to support either High-Level Data Link Control or Link Access Procedure B protocols. One trunk can be configured as a backup supporting transmission when the primary trunk fails. The dual trunks can also be used to support load sharing.

The DPAXes can be configured to route traffic between attached local devices. In addition, the units support switching to another DPAX 1100 or DPAX 2100 trunk. This enables devices connected to one DPAX 1100 or DPAX 2100 to communicate with devices attached to another.

In addition, DPAX 1100 and DPAX 2100 PADs can be linked to a DCA System 9000 or System 7000 T-1 multiplexer or Series 300 communications processor. Series 300 communications processors are basically switches that route traffic between locations at up to 72K bit/sec.

For example, a Series 300 communications processor can link an IBM 3274 cluster controller to a remote IBM front-end processor while also switching X.25 traffic between asynchronous terminals and hosts.

Each DPAX includes an RS-

(continued on page 42)

DSC to introduce T-1 mux net management system

SAN DIEGO — DSC Communications Corp.'s Business Network Systems Group is expected to unveil a network management system for its T-1 multiplexers at the Tele-Communications Association, Inc. (TCA) show here.

The company is also expected to announce at the show that it will sell its line of 45M bit/sec T-3 products directly to end users.

DSC's DEX NMS-L system will monitor and control up to 256 of its CP2000 Digital Network Access System T-1 multiplexers. Future releases will also control the company's DEX Cross-connect Systems (CS).

The DEX NMS-L system consists of a Sun Microsystems, Inc. workstation that links to the diagnostic port of a central-site CP2000 T-1 multiplexer. The system links to remote CP2000 diagnostic ports via the T-1 network.

The DEX NMS-L is used to configure CP2000 networks, monitor systems and gather real-time alarms. In addition, the system detects user-defined error conditions and pinpoints the location experiencing the problem.

The system can also be used to automatically reroute traffic around failed lines and automatically reconfigure the network to bypass failed equipment.

The NMS-L complements DSC's existing DEX NMS-S network management system, which uses an ASCII terminal attached to a CP2000 diagnostic port to manage smaller CP2000 networks. That system requires central-site operators to dial into remote CP2000 diagnostic ports.

The \$50,000 NMS-L also complements DSC's DEX NMS-M, an IBM Personal Computer-based system used to manage medium-size CP2000 networks. With this system, the Personal Computer is directly linked to the diagnostic port of the central-site CP2000 and links to remote CP2000 diagnostic ports via a dial-up or leased line.

DSC is also expected to use the TCA show to kick off a marketing campaign in which it will try to sell end users a host of T-3 equipment previously sold only to carriers.

The DEX CS is a stand-alone digital cross-connect system supporting up to 1,344 T-1 ports or 48 T-3 ports. However, a smaller configuration will support 81 T-1s and eight T-3s.

The DEX CS will extract individual 64K bit/sec DS0 channels from one T-1 line and switch them to another T-1 line. It is also

(continued on page 42)

NETWORK WORLD • SEPTEMBER 26, 1988

New products ready for TCA show debut

Network management system works with NEC and non-NEC gear.

By Jim Brown
New Products Editor

SAN DIEGO — NEC America, Inc.'s Data and Video Communications Systems Division is expected to introduce a network management system at the Tele-Communications Association, Inc. show here today that is capable of managing a mix of NEC and non-NEC equipment.

The NCMS/PC 386 is a microcomputer-based system that enables operators to monitor, configure and perform diagnostic tests on NEC data communications equipment. It can also emulate a Digital Equipment Corp. VT-100 terminal to access other vendors' equipment as an administrative terminal, or it can emulate an IBM 3270 terminal and act as an IBM NetView network management console.

The system includes an NEC PowerMate 386 microcomputer, a 130M-byte hard disk, a 1.2M-byte floppy disk drive, a color monitor and a dot-matrix printer. The NEC microcomputer uses an Intel Corp. 80386 microprocessor with 4M bytes of random-access memory.

The microcomputer supports two interface boards, each of which has six RS-232 ports. Three of those ports can be used to provide links from the NCMS/PC 386 to management ports on three NEC data communications systems. The remaining nine are used to support printer links, attachment to other vendors' equipment and two other 80386-based workstations that can act as remote NCMS/PC 386 operator workstations.

The NCMS/PC 386 can control networks of NEC Signal Processing Network (SPN) leased-line modems, N500A data service units/channel service units (DSU/CSU) and NEC's Intelligent Series of data communications products, which include dial-up modems, leased-line modems and DSU/CSUs.

To control these systems, the NCMS/PC 386 taps into the central-site component of the various systems in place of the ASCII terminals normally used for network management.

The NCMS/PC 386 controls a network of SPN analog leased-line modems by attaching to a Modem Interface Processor (MIP), which is used to receive network management data from up to four racks of SPN modems.

(continued on page 46)

Muxes, modems and net management units to bow at conference.

SAN DIEGO — New product debuts are expected in abundance at the Tele-Communications Association, Inc. (TCA) show starting here today, including the traditional mix of multiplexers, modems and network management systems.

Rad Data Communications, Inc. of Rochelle Park, N.J., will introduce two multiplexers: the SDM-1, which supports AT&T's new Dataphone Digital Service (DDS) Subrate Data Multiplexing (SDM) option, and the STM-4, a four-port statistical multiplexer.

The SDM-1 is a central-site device that can, when used with a 56K bit/sec DDS circuit supporting SDM, handle a mix of 10 synchronous 2,400 bit/sec or 4.8K bit/sec links to remote data service units/channel service units (DSU/CSU) or five 9.6K bit/sec links to remote DSU/CSUs. When

T he DDS SDM option lets users multiplex 2,400 bit/sec, 4.8K bit/sec or 9.6K bit/sec circuits at distant AT&T hubs into a single circuit.



used with DDS circuits with secondary channel, the device can support four additional 300 bit/sec asynchronous channels.

The DDS SDM option lets users multiplex individual 2,400 bit/sec, 4.8K bit/sec or 9.6K bit/sec circuits at distant AT&T hubs into a single circuit. This eliminates the need for multiple DSU/CSUs at the central site and reduces the cost of supporting DDS circuits.

The product also can be used with a 64K bit/sec DS0 data port on a channel bank or T-1 multiplexer to support transmission of multiple lower speed data channels. The device is configured from its front panel.

Rad Data will also announce its STM-4 statistical multiplexer, a device that combines four asynchronous 19.2K bit/sec RS-232 ports over a single 19.2K bit/sec synchronous network link. The STM-4 requires the use of external modems.

The STM-4 is configured using (continued on page 43)

First Look

continued from page 41

V.32-compatible 9.6K bit/sec modem released

Fastcomm Communications Corp. recently announced a CCITT V.32-compatible 9.6K bit/sec modem.

The **FDX 9624** is designed for interactive and rapid file-transfer applications. Operating in full-duplex mode over leased lines or the public switched network, the FDX 9624 allows for data speeds of 9.6K bit/sec in one direction and 1,200 bit/sec in the other, without using echo cancellation. Fastcomm said this method makes the modem less vulnerable to line noise.

The modem combines Microcom, Inc.'s Microcom Network Protocol (MNP) Class 4 error-control standard with trellis-coded

modulation to ensure it retransmits only data that arrived corrupted during the first transmission. Support of the MNP Class 5 basic data-compression protocol increases throughput to 17K bit/sec. This technique replaces a string of repetitive bits with a shortened code. The receiving modem reassembles the original string of bits.

Other features include asynchronous and synchronous operation with automatic speed adjustment to respond to line conditions, LED status indicators, full diagnostics, tone or pulse dialing and an audio speaker with volume control.

The modem is compatible with Bell 212A modems operating at 1,200 bit/sec, Bell 103 modems operating at 300 bit/sec and CCITT V.22bis modems operating at 2,400 bit/sec. The FDX 9624 comes with a Hayes Microcomputer Products, Inc.-compatible autodialer and is compatible with

all software written to work in conjunction with a Hayes-type intelligent modem.

Available now, the FDX 9624 costs \$899.

Fastcomm Communications Corp., 12347-E Sunrise Valley Drive, Reston, Va. 22091, or call (800) 521-2496; in Virginia, call (703) 620-3900.

Desktop voice-response unit for auto dealers debuts

Votrax, Inc. introduced a desktop version of its **Service Response System (SRS)** voice-response unit, which is designed specifically for automobile dealership service departments.

The new version, which supports up to 12 lines, can interface directly with a customized service-scheduling computer sys-

tem purchased from Reynolds and Reynolds Co. of Dayton, Ohio, Automatic Data Processing, Inc.'s dealer services of Hoffman Estates, Ill., or Newgen Service Systems of Toronto. Because it can support its own data base, the system can also work stand-alone.

SRS automatically answers incoming calls and prompts callers to make service appointments by entering commands from a push-button phone. It will also ask callers to enter the extension number they want or stay on the line for an operator. The SRS can call customers and play a digitized voice message informing them that repair work has been completed.

Available now, a four-line SRS costs \$18,500 plus a \$2,500 installation fee.

Votrax, Inc., 1394 Rankin Drive, Troy, Mich. 48083, or call (313) 588-2050. □

DCA betters X.25 PADs, adds model

continued from page 41

232 interface supporting an ASCII administrative console. That console is used to configure the DPAX and to access internal network management data. The DPAX can also be monitored by DCA's Open Network Management System, an IBM Personal Computer-based software package used to manage networks of DCA equipment.

DCA's new PAD, dubbed the DPAX 510, is aimed at the low end of the market. It supports CCITT X.3 standards for packetizing asynchronous data into X.25 format. The unit supports either eight or 16 asynchronous ports and a single synchronous trunk, providing a link to a public X.25 packet network at up to 72K bit/sec.

Prices for the DPAX 1100 and DPAX 2100 PADs range between \$5,990 and \$15,670, depending on configuration. An eight-port DPAX 510 costs \$2,895, while a 16-port DPAX costs \$3,795. The products are expected to ship next month.

DCA can be reached by writing to 1000 Alderman Drive, Alpharetta, Ga. 30201, or by calling (404) 442-4000. □

DSC to introduce net management system

continued from page 41

capable of switching individual T-1s between T-3s or multiplexing 28 T-1s into a T-3 line.

The DEX Electronic Cross-connect System (ECS) comes in two versions, the DEX ECS1 and DEX ECS3. A low-end DEX ECS1 typically supports 100 T-1s and three T-3s, but it can support as many as 32,256 T-1s or 1,152 T-3s. It will route T-1 or T-3 lines from one location to another. It can also extract a T-1 line from a T-3 line and switch it to another T-3 line, or it can multiplex 28 T-1s into a T-3.

The DEX ECS3 supports only T-3s. The unit routes T-3s from one location to another. A low-end DEX ECS3 supports 64 T-3 lines, and the unit can be configured to support as many as 2,048 T-3s.

Lastly, the DTI 45X product accepts a T-3 data stream at a user site and can be configured to extract individual DS0 channels, T-1 or 6.3M bit/sec T-2 lines destined for that location from the T-3 bit stream. It will then insert individual DS0s, T-1s or T-2s destined for other sites into that T-3 bit stream.

DSC's Business Network Systems Group can be reached by writing to 3101 Scott Blvd., Santa Clara, Calif. 95054, or by calling (408) 727-3101. □

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Muxes, modems, management units bow

continued from page 41

an ASCII terminal attached to any of the four RS-232 ports and menu-driven commands stored in nonvolatile random-access memory. The STM-4 supports password security to protect configuration data and will downline-load the configuration information to remote STM-4s.

The STM-4 lists for \$595. Pricing for the SDM-1 has not yet been set.

Concord Data Systems

Concord Data Systems, Inc. of Marlborough, Mass., will introduce its DialAccess 296 modem. The CCITT V.32-compatible modem operates at speeds up to 9.6K bit/sec and will automatically fall back to slower speeds in response to poor line quality.

The product supports Microcom, Inc.'s Microcom Network Protocol (MNP) Class 5 data compression, which enables the modem to achieve a data throughput of up to 19.2K bit/sec under optimal conditions.

DialAccess 296 is also compatible with CCITT V.22 and V.22bis as well as Bell 212A standards. It supports asynchronous or synchronous data in full duplex over dial-up and two- or four-wire leased lines.

The modem displays line conditions on the screens of attached terminals or micro-

all new modems. Current users can upgrade for a fee.

The modems receiving the upgrade include the \$695 VA4224E, which is installed in a VA1680/81 chassis, and the \$1,395 VA4492E, which resides in a VA1682 or a VA1690 chassis.

Existing VA4224E users can upgrade for \$50 by replacing a programmable read-only memory chip. Users of the VA4492E can upgrade for \$100 by returning the modem to a Racal-Vadic repair center.

Digital Sound

Digital Sound Corp. of Santa Barbara, Calif., is expected to announce software that will enable its VoiceServer voice mail system to be integrated with AT&T System

75 or System 85 private branch exchanges.

With the software, System 75 or System 85 users will be able to record personal greetings on their VoiceServer mailboxes. The software will make it possible to light the message-waiting light on System 75- or System 85-attached phones when a voice-mail message is waiting. The software will also enable callers to transfer to an operator after leaving a message or instead of leaving a message.

The System 75 or System 85 integration software will add \$3,000 to the cost of a VoiceServer system, which has a suggested retail price starting at \$19,000. Current VoiceServer users can add the System 75 or System 85 integration software for \$1,000.

Digital Sound is expected to introduce an enhancement to its VoiceForms software, which runs on the VoiceServer and is

similar to a questionnaire. Users can configure the software, for example, to support an order-entry application.

Previously, the system could be configured to ask callers a series of questions and record their spoken answers. Users then had to listen to the responses and manually enter data on a computer.

The enhanced software will ask the same questions, but will enable callers to respond by pushing buttons on the telephone. The software will convert those push-button commands to ASCII characters and store that data in a VoiceServer file. Those files can then be printed on a VoiceServer-attached printer or be downloaded to a host computer.

VoiceForms software supporting the new enhancement costs \$5,600. Current users of VoiceForms can purchase an upgrade for \$1,000. □

DialAccess 296 is compatible with CCITT V.22 and V.22bis as well as Bell 212A standards.



computers, enabling users to determine whether a dial connection will support speeds up to 9.6K bit/sec. It will also display the status of the modem connection. Some of that status information includes the speed at which the modem is currently operating and how much of a transmission has been completed.

Concord will also introduce a new rack that supports up to 16 of its dial-up modem boards, including the new DialAccess 296. The NetAccess 900 rack will also accommodate a NetAccess control board for network management. That board supports an RS-232 link to an IBM Personal Computer or Personal System/2 running NetAccess network management software.

A single Personal Computer or Personal System/2 is able to manage a string of 16 NetAccess 900 modem racks daisy-chained together. Each of those racks must be outfitted with a NetAccess control board.

The network management software will receive alarms from modems in real time and is able to access statistical usage data stored on the control board. Each control board is able to store usage data from each of the modems residing in the same rack.

The DialAccess 296 modem is priced at \$1,795. Prices for the NetAccess 900 rack, NetAccess control board and network management software will not be finalized until the products are ready to ship early next year.

Racal-Vadic

Milpitas, Calif.-based Racal-Vadic, Inc. will announce at the show support for MNP Class 5 on its CCITT V.22bis dial-up modems. The new feature will be standard on

Network World ranks first in advertising page growth.

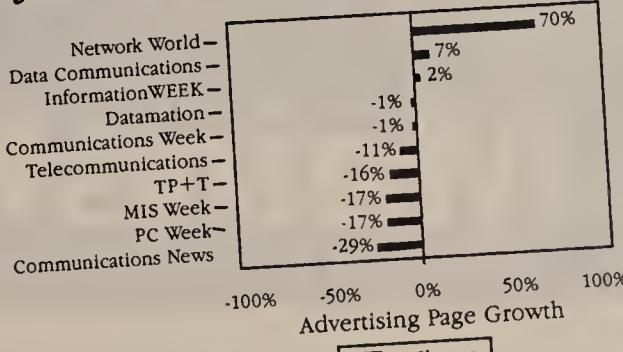
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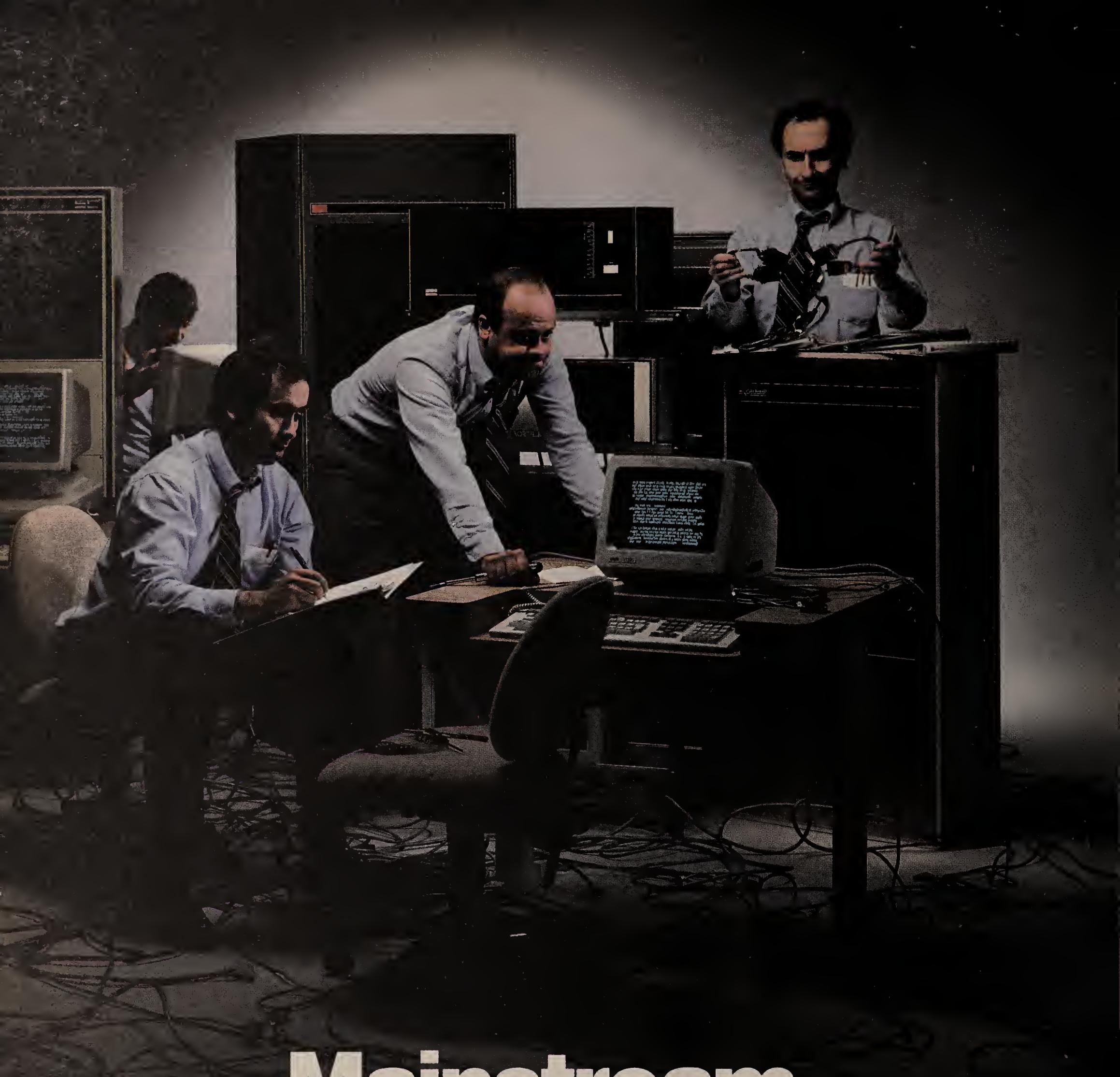
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NEC system works with non-NEC gear

continued from page 41

Each SPN modem rack supports 10 SPN modems. As many as 10 racks daisy-chained together are linked via RS-232 to an MIP port.

Each central-site SPN modem, which can support multipoint configurations, collects diagnostic information via a side channel operating at up to 75 bit/sec. That information is passed to the MIP, which in turn passes the information to NCMS/PC 386.

The microcomputer-based NCMS/PC 386 will also support an upgraded version of NEC's N500A DSU/CSU system, also scheduled to be released at the show. The new N500A Rack II, which supports up to 16 N500A DSU/CSUs, is an improved ver-

sion of NEC's N500A Multiple Mounting Rack. One NCMS/PC 386 can support multiple racks daisy-chained together.

The NCMS/PC 386 cannot receive alarms from DSU/CSUs used with AT&T's Dataphone Digital Service (DDS) with Secondary Channel because the N500A does not support those types of facilities. However, the network operator can configure and test N500A DSU/CSUs via NCMS/PC 386.

The NCMS/PC 386 controls NEC's Intelligent Series of modems and DSU/CSUs by tapping a controller NEC uses in a central-site rack called an Intelligent Chassis. That chassis supports other local Intelligent Chassis. It also collects alarms from remote modems and DSU/CSUs as well as other local Intelligent Chassis and passes them to the NCMS/PC 386.

A single NCMS/PC 386 can monitor as

many as 400 multidrop leased lines supporting up to 2,048 modems, 512 dial-up lines and 512 AT&T DDS circuits, NEC said.

Through software, the NCMS/PC 386 can emulate a DEC VT-100 or IBM 3270 terminal and act as an administrative terminal when linked to the diagnostic port of another vendor's data communications equipment or network management system. When emulating a 3270 terminal, the system can access IBM's host-based NetView network management system and act as a NetView console.

The NCMS/PC 386 includes software that runs under The Santa Cruz Operation, Inc.'s SCO Xenix operating system. The NCMS/PC 386 also includes a relational data base that is used to record and track network configuration, network equipment and circuit trouble tickets, inventory

and network activity.

The NCMS/PC 386 operating system software is multitasking, enabling network operators to investigate alarm conditions while the system monitors the network for other alarms.

For example, a user can run a VT-100 session to communicate with another vendor's management system and at the same time monitor NEC hardware for alarms.

Currently, the product does not support multiple on-screen windows, meaning users must toggle between multiple screens. Each of those screens, however, will contain a geographical depiction of the network.

Access to NetView is sold as an option and consists of an emulation board and a protocol converter. The NCMS/PC 386 can also operate as a NetView/PC interface to NetView. Operating in this mode, the product will convert NCMS/PC 386 alarms to NetView alerts and transmit those alerts to the host running NetView.

When configuring NEC data communications equipment, an NCMS/PC 386 operator can use any of a set of predefined configuration parameters or create customized configuration parameters. These parameters can then be downloaded to both the central-site and remote-site equipment.

When attempting to isolate the cause of a network fault, the NCMS/PC 386's interactive diagnostics feature will prompt network operators to answer a series of questions. It will then suggest which diagnostic tests to conduct. This feature maintains an audit trail that enables the operator to quickly review any actions taken.

The NCMS/PC 386 can also automate the creation of a trouble ticket. An operator can access the data base file containing information about a device or a circuit and then instruct the NCMS/PC 386 to automatically load that information into a trouble ticket.

The NCMS/PC 386 can also support a series of reports including historical-alarm and trouble-ticket reports, the amount of network downtime and network maps.

The NCMS/PC 386 lists for \$16,000 to \$49,000, depending on configuration. The N500A Rack II costs \$995.

NEC is also expected to release a series of other products at the show, including its SPN19205M. Part of NEC's SPN series of analog leased-line modems, the SPN19205M operates synchronously at up to 19.2 Kbps, constant speed, voice/data selection and many, many more features.

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Another product expected to be released, the I5650 DSU/CSU, supports speeds up to 56K bit/sec, while the I5650 Sub Rate supports speeds of 2,400 bit/sec, 4.8K bit/sec or 9.6K bit/sec. These products have been designed to work with the Intelligent Series Chassis. The I5650 costs \$745, while the I5650 Sub Rate is priced at \$645.

NEC will also introduce new modems for the Intelligent Chassis. The AT&T 208A/B-compatible N4811 operates synchronously at 4.8K bit/sec in half-duplex mode over dial-up or two-wire or four-wire leased lines. The DSP9601 is a 9.6K bit/sec V.29 leased-line modem supporting point-to-point synchronous communications in half or full duplex. The N4811 is priced at \$1,195, and the DSP9601 costs \$1,395.

NEC's Data and Video Communications Systems Division can be reached by writing to 110 Rio Robles, San Jose, Calif. 95134, or by calling (408) 433-1250. □

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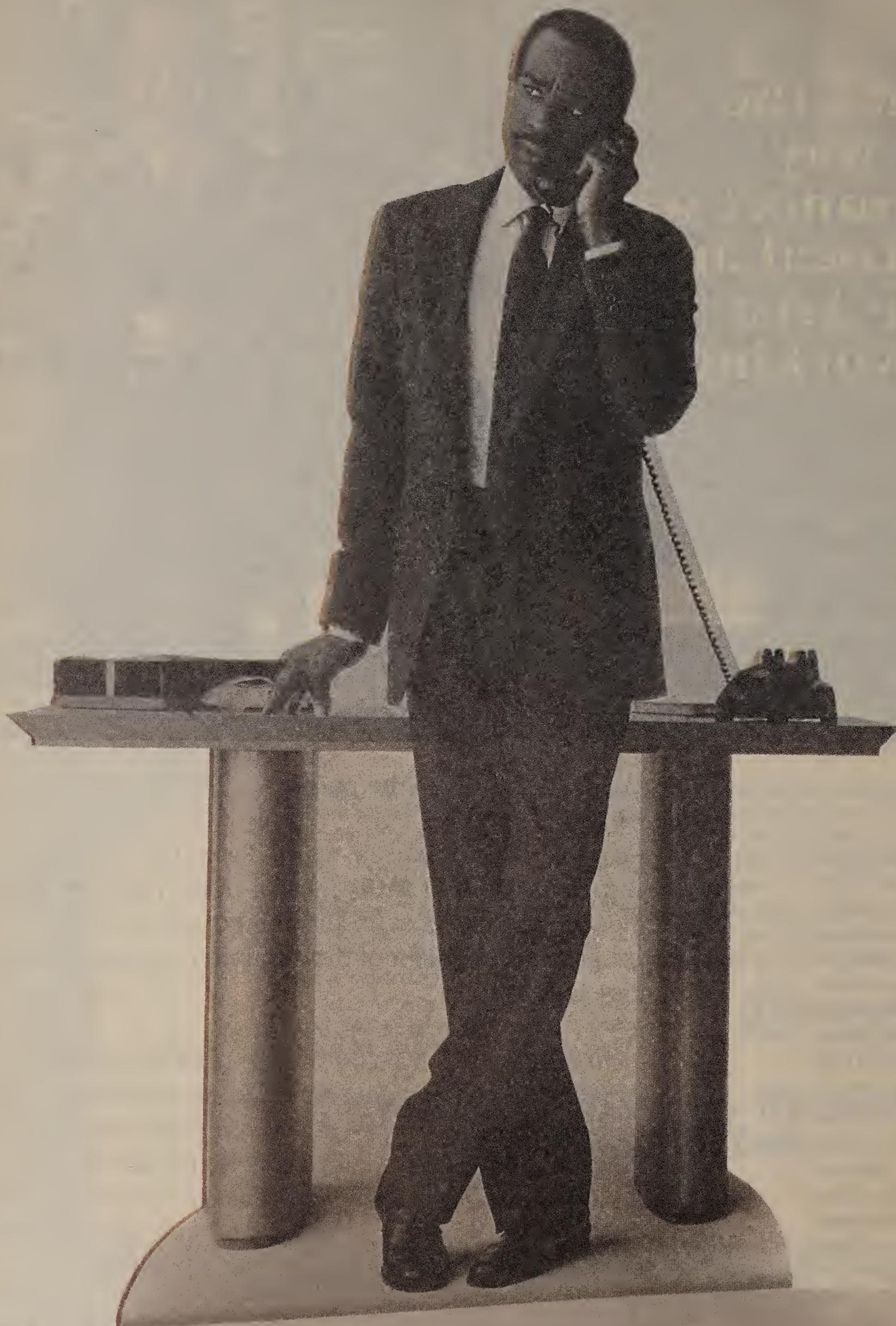
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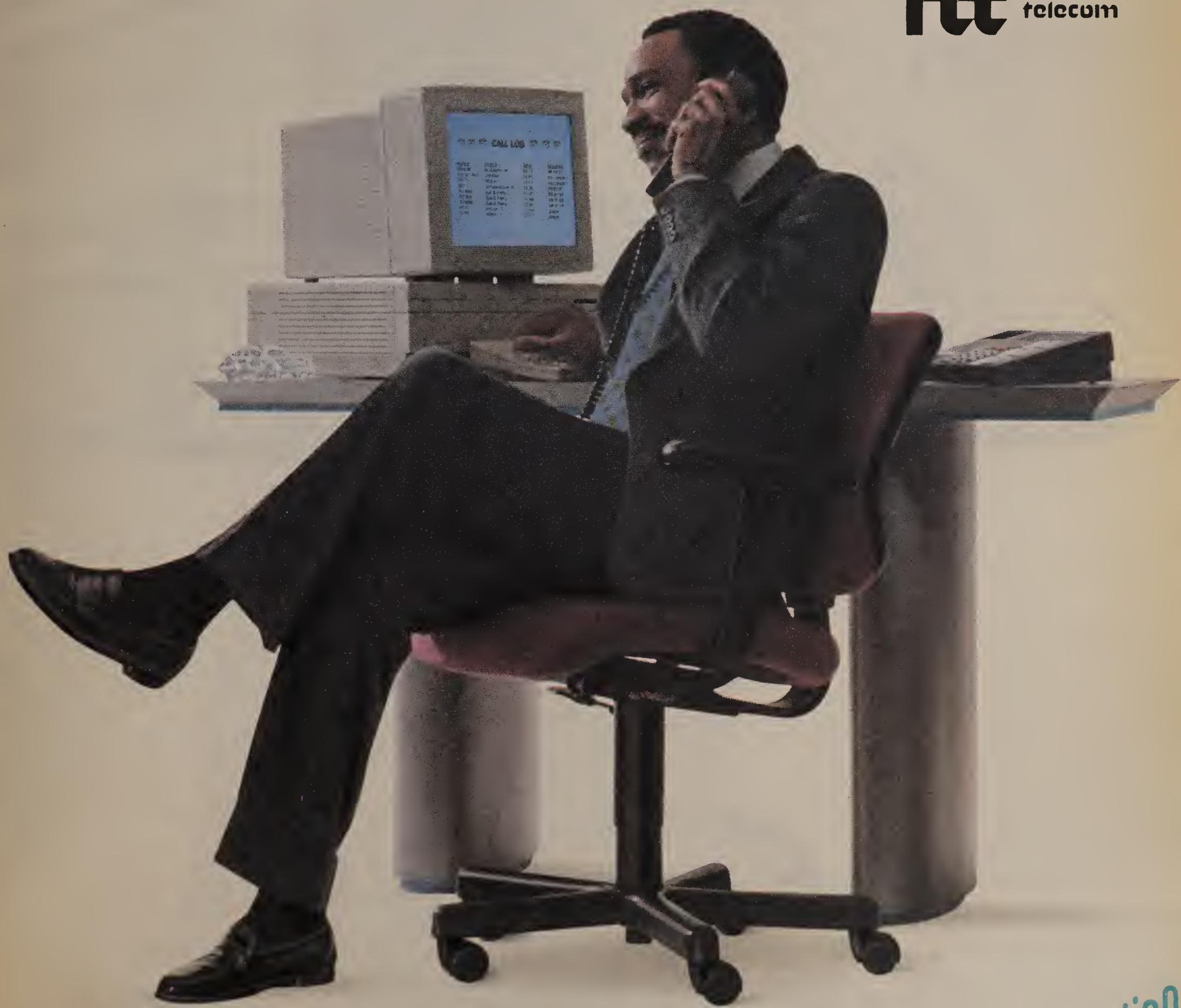
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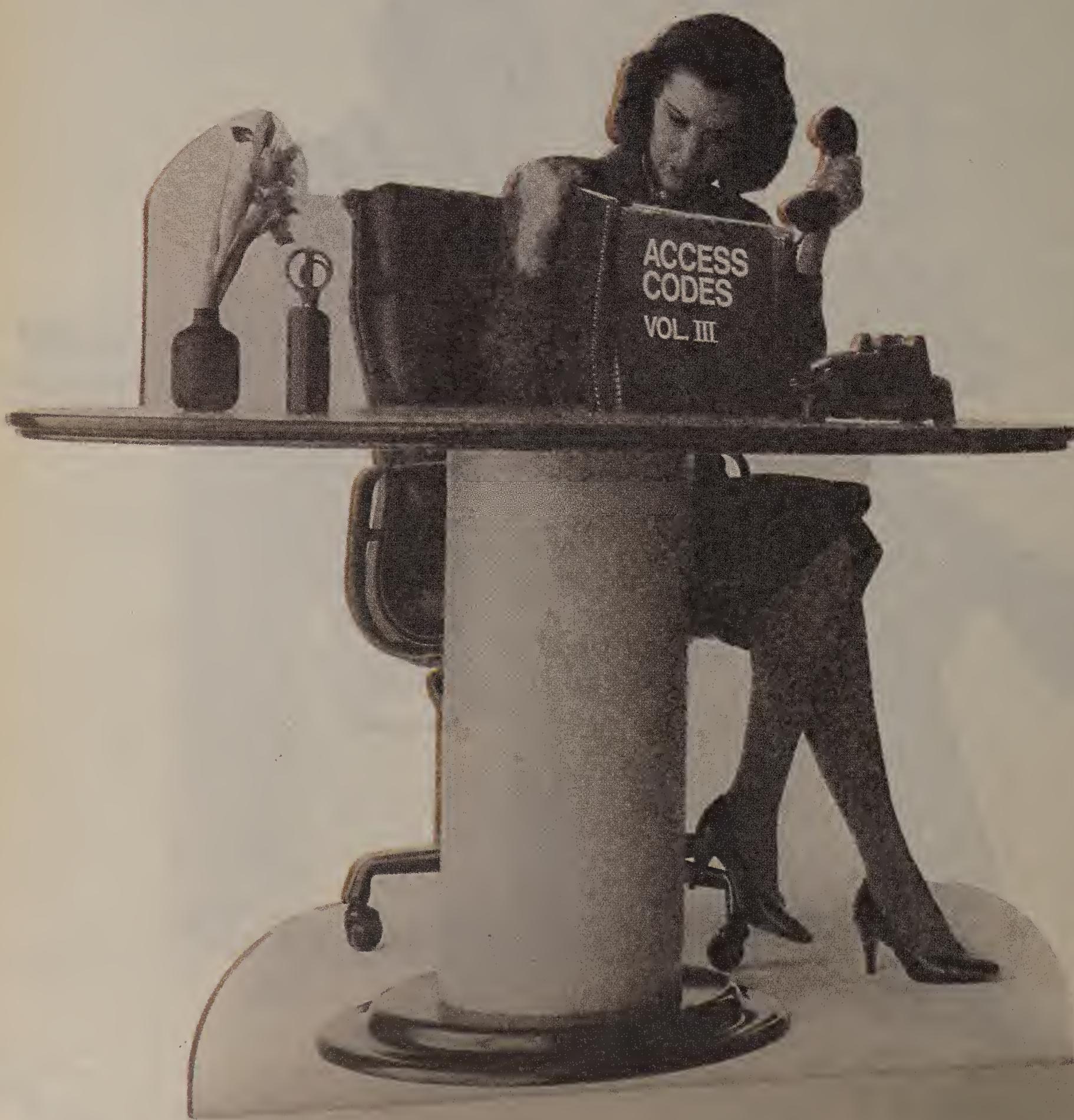
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OPINIONS

STANDARDIZING NET MANAGEMENT

BY JAMES HERMAN

Back to the drawing board for OSI

After 10 years of communications industry efforts to define Open Systems Interconnection protocols so that diverse computers could exchange data easily, it finally dawned on everyone that the goals of standardization could not be met without also standardizing the network management interfaces.

Now, just when OSI proponents thought they had a nearly complete set of protocols for building vendor-independent networks, they have to go back to the drawing board to define vendor-independent network management protocols. Users won't build networks out of OSI components if they can't manage them.

Meanwhile, IBM can claim that OSI isn't ready yet and that Systems Network Architecture and NetView constitute a more complete and mature solution. Most observers agree that usable OSI net management standards won't be defined for at least 18 months. By then, IBM hopes to significantly improve NetView.

Standardizing network management will take a long time because it requires standardizing content as well as format. Defining other elements of the OSI protocol set primarily involved format conventions. But the actual hardware and software data that will be exchanged for network management purposes must be defined. For example, there must be a way of uniquely identifying any piece of network equipment in any network. There also has to be an agreed upon list of parameters, alarms, counters and commands that applies to each piece of equipment.

Further, network management requires an even finer level of detail in which each component and subcomponent of each type of equipment is defined. Network management standardization requires the equivalent of a data dictionary.

A precedent for standardization efforts

There is a precedent for this level of standardization in the electronic data interchange (EDI) arena. Here, too, standardizing the format of the messages is not sufficient. Part numbers and descriptions must also be standardized.

EDI standardization has largely proceeded on an industry-by-industry basis, with the retail, insurance and transportation industries taking the lead in standardizing the data items they need for business transactions common in their industries. The same sort of group effort is beginning to occur with network management. The official standards committees are working on the management data definition problem for OSI protocol software — for example, X.400, TP and X.25.

This will not, however, result in a definition of management data for non-OSI software or for network equipment that doesn't contain protocol software, such as circuits, modems, multiplexers and private branch exchanges. The recently formed OSI Network Management Forum will tackle that problem and seek agreement on the data items needed to manage networks using the new standards. To succeed, members of the forum must cooperate and reach a consensus quickly. They also must make sure that their work meshes well with work being done by other groups.

A similar effort is under way to define a management data model for Transmission Control Protocol/Internet Protocol systems. Individual vendors are beginning to specify what they need to manage their own equipment.

Clearly, we still run the risk of having many different network management standards. There will most likely be overlapping sets of definitions, as happened with EDI standards. Three to four years from now, there will be major efforts to reconcile the different data models.

If there is a lesson to be learned from all this, it is that network management must be part of the functional requirements for all new standards and service definitions. □

Herman writes, teaches and consults on telecommunications technology in Cambridge, Mass.

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EDITORIAL

Career opportunities beckon as global networks multiply

In this information age, virtually all large corporations are multinational. They have either established divisions or subsidiaries in other countries or set up joint ventures with foreign firms. And the pace of multinational mergers and acquisitions is quickening.

Increasingly, multinational firms view the world as a whole. They routinely move resources — money, people and information — around the globe in response to changing economic and political conditions, with as little regard for national boundaries as possible.

It should come as no surprise, then, that multinational companies are becoming more and more dependent upon the global communications networks that link them with employees, customers and suppliers. Multinationals use networks not only for voice, data and video communications but for actual transfer (and thus, import and export) of capital, software and strategic information.

Given the rapidly increasing importance of international networks, it's clear that most managers involved in the planning, implementation and day-to-day management of corporate networks can enhance their career prospects by learning more about how the networking game is played in other countries.

But running an international network is as different from running a U.S. domestic network as soccer is from football.

Managers seeking to build user-friendly global nets face

plenty of challenges. They must identify the best ways to manage and troubleshoot circuits that traverse multiple countries and involve multiple carriers. They must be aware of the ways that national policies differ in terms of tariffs and trade, individual privacy, technology transfer and other issues that can affect their companies' ability to do business internationally via their networks.

Running an international network is as different from running a U.S. domestic network as soccer is from football.



Post, telegraph and telephone administration policies on customer premises equipment, private lines, data encryption and other pertinent items must be monitored continuously.

Managers will also need to track the differences between various countries' implementations of Integrated Services Digital Network, X.25, X.400, X.12 and other key international communications standards.

They should also keep up-to-date on the activities of international organizations, such as the International Telecommunications Union, the International Telecommunications Users Group, the Conference of European PTTs, the International Standards Organization and the Consultative Committee on International Telephony and Telegraphy.

In addition to staying abreast of technical and regulatory issues, managers of multinational networks will have to make a strong effort to avoid the Ugly American syndrome.

The people who succeed at doing business in foreign countries are those who are sensitive to cultural differences and who heed the old saw, "When in Rome, do as the Romans do." Attempts to speak the local language — even if it's only with the help of a pocket phrase book — are usually much appreciated.

Finally, as foreign markets are liberalized, U.S.-based managers will need to broaden their horizons when making purchasing decisions. They'll have to sift through an avalanche of networking products and services from all of the world's leading vendors of communications products and services.

Managers who meet all the challenges outlined above — and who don't mind traveling — will find themselves in high demand as the international networking market heats up over the next decade.

Today, international networking expertise is a rare commodity among networking professionals. By the end of this century, it will be a necessity. □

OPINIONS

VOICE-MESSAGING STANDARDS

BY GEORGE SOLLMAN

Both users and vendors will be aided by AMIS Council

On March 7, U.S. District Court Judge Harold Greene issued a ruling that has had a tremendous impact on the voice-messaging industry. This ruling allowed the provision of enhanced services by the regional Bell holding companies, enabling them to offer voice-messaging products to their business and residential subscribers.

With considerable legal reserve, Greene wrote, "What has until now been a relatively quiescent market is likely to become a broad, vigorous one."

The ruling has greatly expanded the voice-messaging industry, in part by giving voice messaging increased exposure and credibility. The result, according to Probe Research, Inc., a market research firm in Morristown, N.J., is that the voice-messaging market has seen a 50% compounded annual growth rate in the last five years. That growth is expected to lead to a \$1 billion market by 1991.

Imagine the user benefits and concomitant industry growth that would result if the voice-messaging industry were to establish a set of intervendor standards, much as standards have been set in the facsimile industry. This is, in fact, a milestone the voice-messaging industry is working toward now.

The AMIS Council

Today it is not possible for a user to move messages from one vendor's voice-messaging system to another vendor's system. This is analogous to the unimaginable situation in which a caller on one PBX could not place calls to someone on another manufacturer's PBX.

Working to eliminate this problem, five of the industry's leading vendors and 10 major corporate voice-messaging users met in Atlanta this January to discuss long-term intervendor networking problems and the need for users to be able to exchange messages between all voice-messaging systems. The Audio Message Interchange Standard (AMIS) Council was formed to establish intervendor networking standards.

Sollman is president and chief executive officer of Centigram Corp., a supplier of voice-messaging systems and a charter member of the Audio Message Interchange Standard Council.

The AMIS Council intends to achieve benefits for users and vendors similar to those the facsimile industry gained by the same process. The standards effort in the facsimile marketplace caused that industry, which had been relatively modest, to explode into the high-growth marketplace we see today.

Given effective standards and their implementation by vendors, the AMIS Council expects a similar explosion to occur in the voice-messaging marketplace, an explosion that will dwarf the expectations alluded to in Judge Greene's ruling.

Analog vs. digital

At the council's initial meeting, members proposed and discussed a specification that provides for analog networking of vendor systems. This specification has now been reviewed by

Voice-messaging standards mean reduced equipment prices as a result of the substantially higher manufacturing volumes.



the five leading participating vendors — Centigram Corp., AT&T, IBM/Rolm Systems Division, Octel Communications Corp. and VMX, Inc. — as well as by major corporate users such as Eastman Kodak Co., The Coca-Cola Co., The Travelers Corp. and Amoco Corp.

The AMIS Council, now formally part of the Information Industry Association, will serve as the administrative focal point among major vendors and users of voice-messaging systems for the purpose of developing this standard.

Also, this group has retained an outside consulting firm, Hatfield Associates, Inc. of Boulder, Colo., to facilitate efforts to formulate the desired interchange standards. As a result, an analog interchange standard should be complete within the next 12 months. A digital standard will be developed soon thereafter.

The analog vs. digital interchange standard decision has

been a controversial one. Analog, the less sophisticated alternative, is attractive because of the networking products available based on that technology. On the other hand, digital offers none of the limitations of internodal transfers found in analog networking, and it can transfer messages more efficiently and provide higher quality sound.

So the AMIS Council has chosen analog for the sake of near-term expediency. However, most agree digital networking is the technology of the future.

User fallout

What do voice-messaging standards mean for the user? A great deal, namely:

- The ability to exchange messages worldwide among all machines built to one standard;
- The ability to make substantial capital investments in voice-messaging equipment without fear of future obsolescence;
- The development of voice-messaging as a highly effective communications tool;
- Greater strengthening of individual voice-messaging vendors and their product lines over time because of the greater expenditures on research and development made possible by the expanded marketplace and its consequent revenues; and
- Reduced equipment prices as a result of the substantially higher manufacturing volumes.

The implications for the vendor community are numerous. The key vendors in the industry must forsake their own interests to achieve a larger goal that will allow substantially greater growth of the entire industry.

There must be a commitment on the part of each vendor — and each major end user — to rapidly review the proposed specifications in depth to provide the most effective and usable intervendor networking standards specification. Further, vendors must rapidly incorporate the standards into their hardware so users will realize the commercial benefits as soon as possible.

The voice-messaging industry is maturing. It now appreciates the mutual benefits a standard for message interchange can provide for everyone. Vendors and users alike must work hard to reach the highest level of intervendor voice-messaging specifications possible over the next year. □

TELETOONS

BY FRANK AND TROISE

Look after things while I'm attending this challenging, in-depth tutorial, will you?



LETTERS

The risks of PVC

I read with concern the article in your July 25 issue ("Users face risk from PVC wire") and the companion editorial ("PVC-covered wiring can be hazardous to your health," Aug. 1) regarding the alleged hazards of polyvinylchloride (PVC) wiring. Both items contain factual errors and draw erroneous conclusions about the safety and health effects of this product. The consultants quoted in your article appear to be totally misinformed about the performance properties of PVC.

First, recent testing performed at the Southwest Research Institute on behalf of the Federal Aviation Administration has demonstrated that hydrogen chloride — a combustion product (along with carbon monoxide) when PVC

burns — does not present the health hazard your articles claim. In those tests, baboons, who have respiratory systems much like humans, were not incapacitated when exposed to hydrogen chloride levels hundreds of times higher than any ever measured in real-life fires.

As a matter of record, no fire death has ever been linked to the inhalation of hydrogen chloride. Carbon monoxide continues to be recognized as the cause of fire

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Network World welcomes letters from readers. Letters should be typed, double-spaced and sent to Editor, Network World, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701.

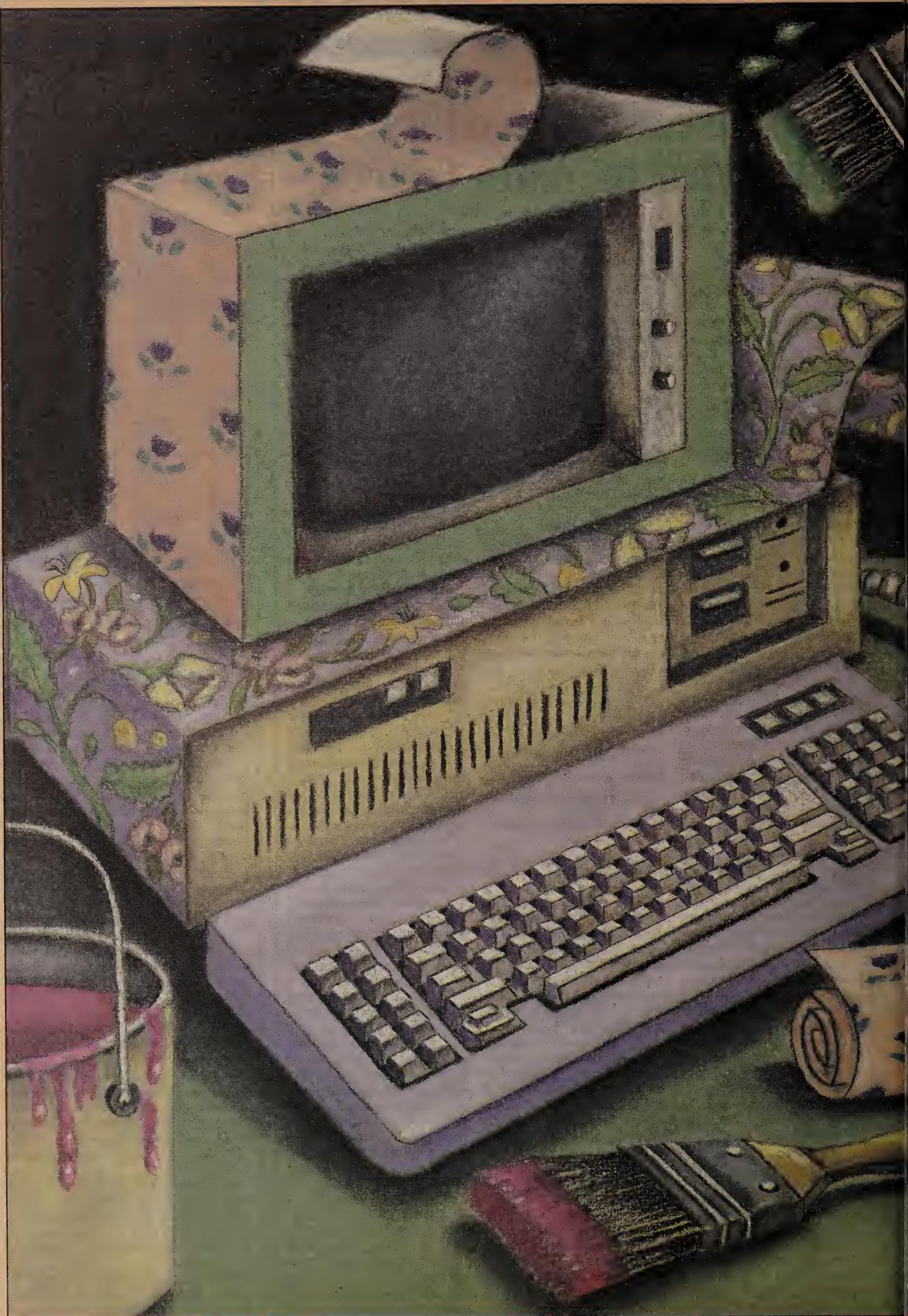
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FEATURES

Remodeling the LAN market

Minicomputer LAN servers and integration systems put a new face on a traditional PC stronghold.

CONTINUED FROM PAGE 1
minicomputer environment to the personal computer and vice versa.

Mini to micro

Minicomputer vendors first tried to compete directly with the personal computer by selling scaled-down minicomputers, such as the VAXstation, VAXmate and MicroVAX from Digital Equipment Corp., and the 370 Personal Computer and 3270

Horn is a consultant with Network Strategies, Inc., a communications consulting firm in Fairfax, Va.

Personal Computer from IBM. But users preferred the simplicity, efficiency and cost-effectiveness of a dedicated single-user personal computer.

Recognizing the impossibility of simply replacing the personal computer hardware platform, minicomputer vendors next pursued software strategies for supporting personal computers. The most successful such approach to date is terminal emulation.

Basic terminal-to-host connections were augmented with capabilities such as two-way file transfer, window interfaces, hot-key switching between DOS and host sessions, multiple sessions

and shared printing. But the market for terminal emulators, operating stand-alone or over a local-area network, is a battleground of prices and features. Minicomputer vendors are meeting severe competition from third-party developers.

Minicomputer makers also tried a third method of porting their host environment to the personal computer via software: by trying to turn the personal computer into a minicomputer and thus make it a full peer node on the departmental network. Because moving the minicomputer's proprietary system and application software to the personal computer is something only the minicomputer vendor can do, it effectively eliminates third-party competition. Products such as DEC's DECnet DOS with PC All-In-1 or Wang Laboratories, Inc.'s PC Office replace DOS applications and the DOS interface with the environment of the minicomputer.

But minicomputer applications generally run best on minicomputers because of their requirements for memory, I/O bandwidth and processing cycles. It is difficult for a microcomputer

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(continued from page 57)
 architecture like the IBM Personal Computer with MS-DOS to support an application designed to run under a multitasking system with high I/O bandwidth. Also, most users still want to run some DOS applications, but DOS memory limits make it very difficult to support both personal computer and minicomputer processing.

Micro to mini

Realizing that many personal

computer users would not give up the DOS prompt, some minicomputer vendors took a different tack: supporting the DOS environment on the minicomputer. They turned the minicomputer into a personal computer local-area network server. Wang's Vdisk, for example, provides a virtual DOS disk on the minicomputer's disk drives for personal computer users and their applications to access across the local-area network. The major compo-

nent of these products is a disk server, in which logical DOS drives are defined and allocated to individual users or groups of users, appearing to them as local disk drives.

With virtual disk systems, the DOS files are actually formatted and stored as minicomputer files. Other minicomputer users can be allowed access to the files, so that file transfer and sharing is supported among personal computer and minicomputer users. Howev-

er, disk servers do not perform file-, record- or byte-level locking, so they do not permit simultaneous read and write access to files — a critical capability of most personal computer local-area network servers.

To provide simultaneous file sharing through record locking, a vendor has to specify an application interface and a protocol for access control. These requirements demand complex software development, which minicom-

puter vendors have avoided by selling simpler but still useful disk servers.

Many DOS local network server-based applications, such as dBase III+, cannot use the disk server to create multiuser data files. They require a dedicated file server instead to provide file-, record- and byte-level access control for simultaneous file sharing. Virtual disks on minicomputers do provide some of the advantages of centralized processing, however, such as centralized administration and automatic backup of the shared disk.

The virtual disk products have proven useful but have not achieved great popularity. A major problem with most is performance. Disk server requests from personal computers on the local-area network must compete for CPU time with each other as well as with minicomputer applications.

Moreover, virtual disk products are generally not integrated with other vendor offerings. Like the other personal computer integration products described above, virtual disks are usually separate products that won't necessarily work with the vendor's other personal computer integration products.

True integration

Recognizing that virtual disks are not enough to put a minicomputer on everyone's local-area network, vendors are seeking to achieve more complete integration. Chart 1 on page 82 lists the products and architectures announced by some of the major minicomputer vendors.

Most minicomputer makers have announced global integration strategies, such as IBM's Systems Application Architecture and Wang's Technology for Integrating End-user Systems, by which processing across personal computer, minicomputer and mainframe platforms will be distributed and connected. Some vendors are now starting to deliver products that actually do integrate personal computer local-area network and minicomputer processing.

The four major components of integrated minicomputer/microcomputer local-area network systems are:

- Microcomputer-based local-area network file server capabilities on the minicomputer;
- An integrated communications services package (for example, terminal emulation, directory services and printing);
- Integrated minicomputer/microcomputer utilities and applications; and
- A common user interface.

To provide complete file server capabilities, minicomputer vendors have had to create their own local-area network operating systems along the lines of 3Com Corp.'s 3+, Novell, Inc.'s NetWare and Banyan Systems, Inc.'s VINES. Through a local network operating system, applica-

(continued on page 62)

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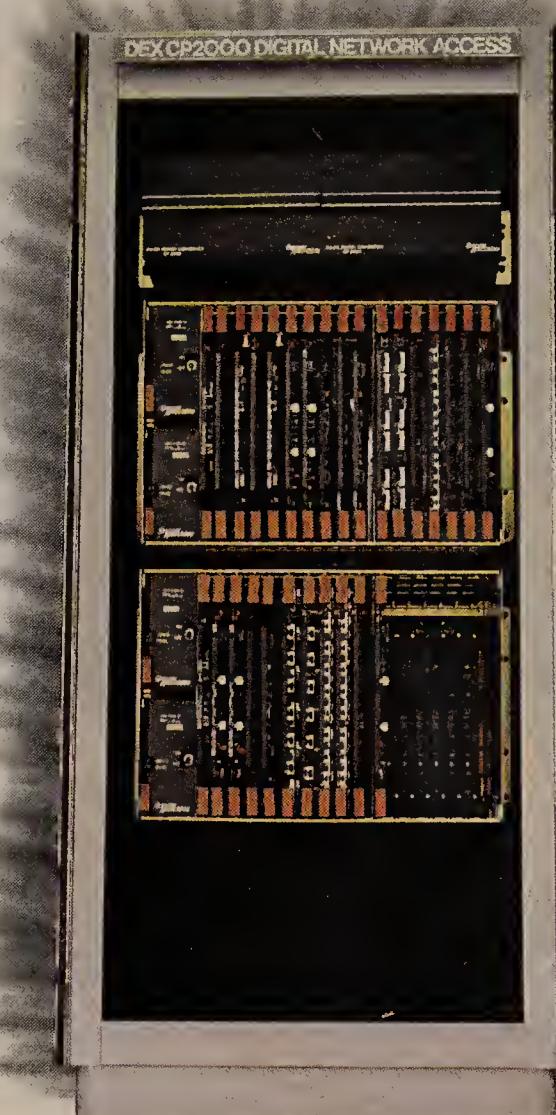
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- **Supported Protocols:** IEEE 802.3, BSC, SNA/SDLC, IBM 3270, HDLC, X.25 Transport.
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(continued from page 58)

tion interfaces and access control mechanisms are implemented on every local network workstation and server, as an extension of the DOS 3.1 capabilities.

Chart 2 on page 82 illustrates the major components of the local network operating system. Such software runs on each personal computer node as well as on the minicomputer/server. It provides two important interfaces: DOS 3.1 shared file access and Network Basic I/O System.

The DOS 3.1 interface supports the file server requests defined by Microsoft Corp., which allow simultaneous sharing of files (for example, Open file for read only, Lock record and Write byte range). This interface is used by major local-area network applications, mostly data bases such as dBase III+. The NETBIOS interface provides a program-to-program com-

munications pipe and is used by third-party local-area network applications such as electronic mail.

To communicate DOS 3.1 server requests and NETBIOS calls across the local-area network between personal computers or between personal computers and the minicomputer/server, local-area network operating systems need an underlying set of protocols for transport and internetworking. Most of today's local-area network operating system vendors use a version of Xerox Corp.'s Xerox Network Systems or Transmission Control Protocol/Internet Protocol.

DEC and Wang have chosen DECnet and Wang Systems Networking, respectively. At the lowest layers, the local network operating system incorporates a hardware local-area network interface, such as an Ethernet, Arcnet or token-ring adapter.

DEC and Hewlett-Packard Co. use Ethernet, IBM uses Token-Ring, and Wang plans to use both.

Another major characteristic of these new offerings is their packaging. Rather than offer the file server capability (such as the local net operating system with DOS 3.1 and NETBIOS interfaces) as just another integration product, vendors are bundling the best of their other offerings, such as terminal emulation, printing services, file transfer and conversion routines, into one package with a single user interface.

The final and most significant characteristic of the new integration products is the implementation of cooperative personal computer and minicomputer processing through distributed applications. For example, Wang's LAN Office is a more or less complete version of VS Office, but it runs on a local-area network. Office is

Wang's office automation package, similar to DEC's All-In-1. It consists of E-mail, file transfer and directory services, calendars and shared-document libraries all tied together with a single-menu system. The VS is Wang's line of general-purpose minicomputers, similar to DEC's VAX line.

In Wang's integrated office scenario, each personal computer has a copy of LAN Office, but shared data, such as mail and directories, is stored on the file server. In

(continued on page 82)

Letters

continued from page 55

deaths when all building materials such as wood and plastics burn.

Other tests conducted at Southwest Research contradict the claims in your articles that fumes from PVC are carried throughout a building in a fire. On the contrary, these tests found that, unlike other fire gases such as carbon monoxide, hydrogen chloride tends to be absorbed quickly by nearby porous surfaces, such as cement block, ceiling tile and drywall. Consequently, little travels from the fire scene to uninhabited portions of the building. Together, these two test programs demonstrate conclusively that PVC wiring does not present any unusual health and safety hazards.

Moreover, your readers should know that PVC possesses excellent resistance to combustion, has a very low flame-spread rating and a very low rate of heat release. It also meets Underwriters Laboratories, Inc. specifications and National Electrical Code requirements and is widely specified and used in wire and cable applications for precisely these reasons. It has been used safely for over 40 years for wire and cable products, and as such, has a far greater demonstrated performance record than any other material on the market.

Your readers' actions regarding removal of old or unused PVC wiring should, of course, be guided by their local codes. There is, however, no scientifically substantiated reason to regard it as an unusual hazard to the safety of a building or its occupants.

Roy Gottesman
Executive director
The Vinyl Institute
A Division of The Society of the Plastics Industry, Inc.
Wayne, N.J.

We are not aware of the specific tests to which Gottesman alludes. However, we stand by our report regarding improperly installed PVC-coated wire. A number of groups, including the Occupational Safety and Health Administration and the National Bureau of Standards, have raised concerns about chemicals released by PVC products during combustion. This issue has also been a great concern of the International Association of Fire Fighters and other labor groups.

It is recognized by a number of authorities that burning PVC gives off a variety of harmful chemicals, including hydrochloric acid carried in soot. Researchers have studied the effects of PVC combustion on fire fighters and victims of several major fires, including the February 1975 fire at a N.Y. Telephone Co. switching center and the 1980 MGM Grand Hotel fire in Las Vegas. Clearly, there are significant concerns about the dangers of PVC combustion.

— Editor

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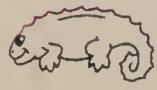


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PC

BUYER'S
GUIDE

LAN servers

The engine of the local-area network

Today's leading LAN servers speed data along in overdrive.

By JOHN HUNTER

You can't predict an automobile's performance by considering only the size of its engine. As the saying goes, cubic inches can be beat by cubic cash — that is, there are many engineering factors that affect performance.

Similarly, too much emphasis is given to local-area network backbone speeds when local net servers are rated. Conclusions such as "Ethernet runs at 10M bit/sec and token ring can handle only 4M bit/sec, so Ethernet is the hotter performer" are illogical. A network is only as fast as its slowest link.

Users shopping for local-area network servers are deluged with marketing hype and literature that often confuses them more

Hunter is president of TMS Corp., a telecommunications consulting firm in Devon, Pa.

than it informs them. They spot a product using an Intel Corp. 80386 microprocessor and think, "It has a 32-bit capacity and 20-MHz clock rate; it must blow the doors off a 16-bit 80286 poking along at 10 MHz." But the conclusion that an 80386 machine will always be a superior server is wrong.

Another data sheet eye-catcher is the disk seek time, the measure of how long it takes a read head to go to the farthest points on the disk. Vendor claims of disk seek times such as 18 and 20 msec or faster give the illusion of quick data-retrieval times, but that's not necessarily so, either.

Disk data-transfer rate is yet another enticing figure. After all, a server that can pump data to main memory at 4M bit/sec must be more powerful than one that musters only 1M bit/sec. That

conclusion, however, can also be erroneous.

Backbone speed, disk seek time, type of microprocessor and data-transfer rate are important elements in evaluating a server. But each should play only a small role in the overall process of choosing one. According to Joe Seidler, vice-president of Santa Clara, Calif.-based Infonetics, Inc., a consulting company that tests local-area networks, "You have to know what percentage each element plays in the data-transfer process and how long it takes to do its job. The importance of each element depends greatly on the specific application being used."

Seidler says that if 90% of the time to get data to or from a server is disk seek time, then increasing the transfer rate is going to have very little effect. "On the

other hand, if the application requires the transfer of very large blocks of data, then the transfer rate for that application is perhaps 30% to 40% of the total wait time," he says. "You really need to know the entire environment."

Many elements contribute to a local-area network's efficiency, but one of the most important is the server's ability to quickly satisfy user requests for access to system resources, such as data bases, printers and modems. If the server is slow to respond, network performance suffers, regardless of the backbone speed.

Many servers are based on personal computers, while others are based on more powerful computers. But they all have the same basic components: an operating system, microprocessor, ran-

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dom-access memory, disk storage and, in most cases, tape backup that captures transactions.

The operating system is the key component. It controls how user requests are handled and initiates the calls to disk storage for data retrieval.

The accompanying chart on page 83 compares the technical attributes of the leading local-area network servers on the market. While most of the entries are self-explanatory, a few need clarification. "Compatible LAN" refers to the local-area network cards accommodated. Since all local network vendors have their own network control software, be sure to find out whether the candidate server is compatible with that software.

The "Maximum ports" column indicates the number of serial and parallel ports available for connecting devices such as printers and modems. It does not mean the number of workstations accommodated; that's determined by the network control software.

The "Minimum RAM for system software" column refers to the amount of storage needed to hold the server's operating system and, in some cases, network control software. Users should check with vendors to determine exact RAM needs.

Data storage considerations

If the server provides data base management facilities, then disk performance issues such as seek time and data-transfer rates become obvious issues. However, equally important are the methods of storing, linking and retrieving data. Interleaving, disk caching, directory hashing and elevator seeking are methods for decreasing data-retrieval time.

With elevator seeking, the disk controller program simultaneously examines multiple I/O requests, compares the requested track/cylinder locations with current read/write head positions and services the requests in such a way as to minimize read/write head movement. This substantially reduces disk seek time, one of the big performance drains on a file server.

Directory hashing boosts performance by keeping the most frequently requested disk addresses in cache memory. Disk caching does much the same thing, but the most frequently requested files and records are held in the RAM cache memory. Vendors of products that support elevator seeking and directory hashing include Novell, Inc., 3Com Corp., Hewlett-Packard Co., Digital Equipment Corp., Banyan Systems, Inc., Univation, Inc. and Wang Laboratories, Inc.

Microprocessors

Many servers use the Intel 80386 microprocessor to increase the range of addressable memory, to decrease I/O data-transfer time by increasing the volume of data moved from the hard disk to memory and to decrease overall data processing time.

With a 32-bit memory bus and a 32- or 16-bit I/O bus, the 80386 clearly processes data more quickly than the 16-bit Personal Computer AT bus employed by the popular 80286.

However, a server with 32-bit I/O will not process data twice as fast as one with 16-bit I/O. Some vendors have optimized their software so that an 80386 using fast RAM will perform nearly as well with 16-bit I/O as with 32-bit I/O.

The IBM Personal System/2 Model 80 has received much attention in the local-area network server wars. As the compari-

son chart shows, it uses an 80386 with 16- or 20-MHz clock rates. However, unlike servers using the Personal Computer AT bus architecture, the Model 80 uses the Micro Channel architecture, which handles data in large bursts (up to 19M bit/sec, according to IBM). By using burst mode, the server has substantially less overhead and more overall operating efficiency than a byte-mode unit.

The Network Connection, Inc.'s Triumph server also uses a different approach to increase overall processing efficiency. Instead of souping up the disk data-transfer rate, it uses a coprocessor on the disk controller board, rather than the main processor, to read data into memory. Triumph uses a smart disk controller card with its own Motorola Corp. 68000 (10-MHz) microprocessor, 512K bytes of RAM, 512K bytes of programmable read-only

memory and a separate disk-controller operating system.

Backup systems

Anyone who has experienced a hard-disk failure or power interruption that wipes out files and transactions can appreciate the value of a backup system. As the accompanying chart shows, many vendors offer some form of tape or cartridge backup for logging data. This information can be used to restore the wiped-out data base.

While tape furnishes adequate backup, the glamour product is the mirrored, or shadowed, disk facility offered by vendors such as Novell, 3Com, The Network Connection and Faultnot Technologies, Inc. Pioneered by Novell and offered as part of its System Fault Tolerant version of NetWare, this facility employs dual disks that mirror each other.

As data is written to one disk, it is also written to the secondary unit. Should the primary unit fail, control automatically switches to the second disk and processing continues unabated.

The Novell product also duplicates the disk controllers. Aside from providing a redundant unit, the dual-controller dual-disk combination permits dual seeks to be performed, substantially reducing data-retrieval times. Dual seeking occurs when the operating system examines requests, determines which drive can respond most quickly from its current head position and initiates commands to permit concurrent read/write operations.

Local-area network server shoppers don't need to buy products from Novell or 3Com to enjoy the security of mirrored disks, however. Atlantic Microsystems, Inc. of Salem, N.H., offers a product called

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the Me 2/FS that works with ordinary dual-disk IBM Personal Computer ATs and provides the same disk-shadowing services. 3Com, in fact, uses the Me 2/FS to attain its mirrored-disk capability.

The Me 2/FS is a software-only disk utility that is compatible with DOS and automatically writes the same data recorded on the primary disk to the secondary. Both disks appear as one logical drive to the operating system, and, if either disk should fail, operations are automatically shifted to the surviving disk. Up to 128M bytes can be mirrored. For companies wishing to mirror disks at the workstation level, Atlantic Microsystems offers the Me 2 software utility that performs the shadowing for nonshared disks.

Operating system efficiency

Local-area network buyers that are en-

grossed in hardware details and quibble over a few milliseconds here and there often pay insufficient attention to the efficiency of the operating system. That's a big mistake. The operating system is the brains of the server, and it plays a large role in overall efficiency.

Over the years, PC-DOS and MS-DOS have dominated the market, although strong challenges have come from Novell's NetWare and 3Com's 3+. As local-area networks have grown and data activity has increased, the single-tasking nature of DOS and its direct memory-addressing limitation of 640K bytes have become unacceptable.

Therefore, multitasking operating systems such as NetWare, 3+, OS/2 and Unix, plus as yet unreleased products such as IBM's LAN Server and Microsoft Corp.'s LAN Manager, are now considered better

choices for large networks with a high level of transactions. (LAN Manager has been released to hardware manufacturers but not to the general public.)

The ability to handle multiple tasks simultaneously has also become important as network size has grown, accounting for the popularity of operating systems such as NetWare, 3+, Unix, DEC's VMS, HP's MPE, Univation's LifeNet OS and Wang's VSOS.

Microsoft's OS/2, of course, will join that group once it's fully released.

OS/2, for example, has multitasking with multithread processing, operates in protect mode and supports disk caching and elevator seeking.

The Microsoft and IBM products will also support networking services, which allow functions to be distributed to different workstations, as opposed to centraliz-

ing them in a file server.

Multitasking allows more than one task to be performed at a time, while multithread processing permits jobs to be broken down into segments that are processed concurrently. Protect mode ensures that if one processing task is disrupted, other tasks won't be affected.

OS/2 and its local-area network facilities, however, extract a high price in RAM. Each workstation needs between 1½M and 2M bytes of RAM, while the server requires that 4M bytes be devoted.

AT&T's Unix V also offers multitasking (but not multithread or protected-mode processing) and distributed networking services, but it needs less memory. According to AT&T, workstations must devote 1M byte of RAM, and the server gives up 3M bytes.

Unix V doesn't perform multithread processing per se, but it does support a form of it if the application is structured into a collection of tasks, which AT&T calls processes, that can run simultaneously under Unix.

Some industry experts feel that the distributed processing attainable with LAN Manager, LAN Server and Unix will be the principal attraction of those products, especially for large installations. Among them is Gail James, president of LanQuest Group Corp., a Santa Cruz, Calif., consulting firm.

"While products like NetWare and 3Com provide multitasking at the server level, OS/2 extends it to the workstation level as well," James says. "That makes for very effective distributed processing."

The volume of the LAN Manager code concerns James somewhat, however. "I'm afraid some people won't find [LAN Manager] to be a performance winner," he says.

Drew Wolf, a product marketing specialist with Banyan Systems, Inc., agrees that distributed processing will be one of the selling points of OS/2-based servers, but he says he feels that such distribution will cause network management problems. "Users are constantly added, and new files are created all the time. It's going to be a hard job managing that compared with a product using a central file server," he says.

Dan Sherwood, product manager for HP's LAN Manager, agrees. "It's a complex job," Sherwood says. "How do you back up and restore data spread out like that?"

But James disagrees. "With the powerful network management tools available and announced for LAN Manager, I don't think it's going to be any harder managing it than, say, a NetWare [server]."

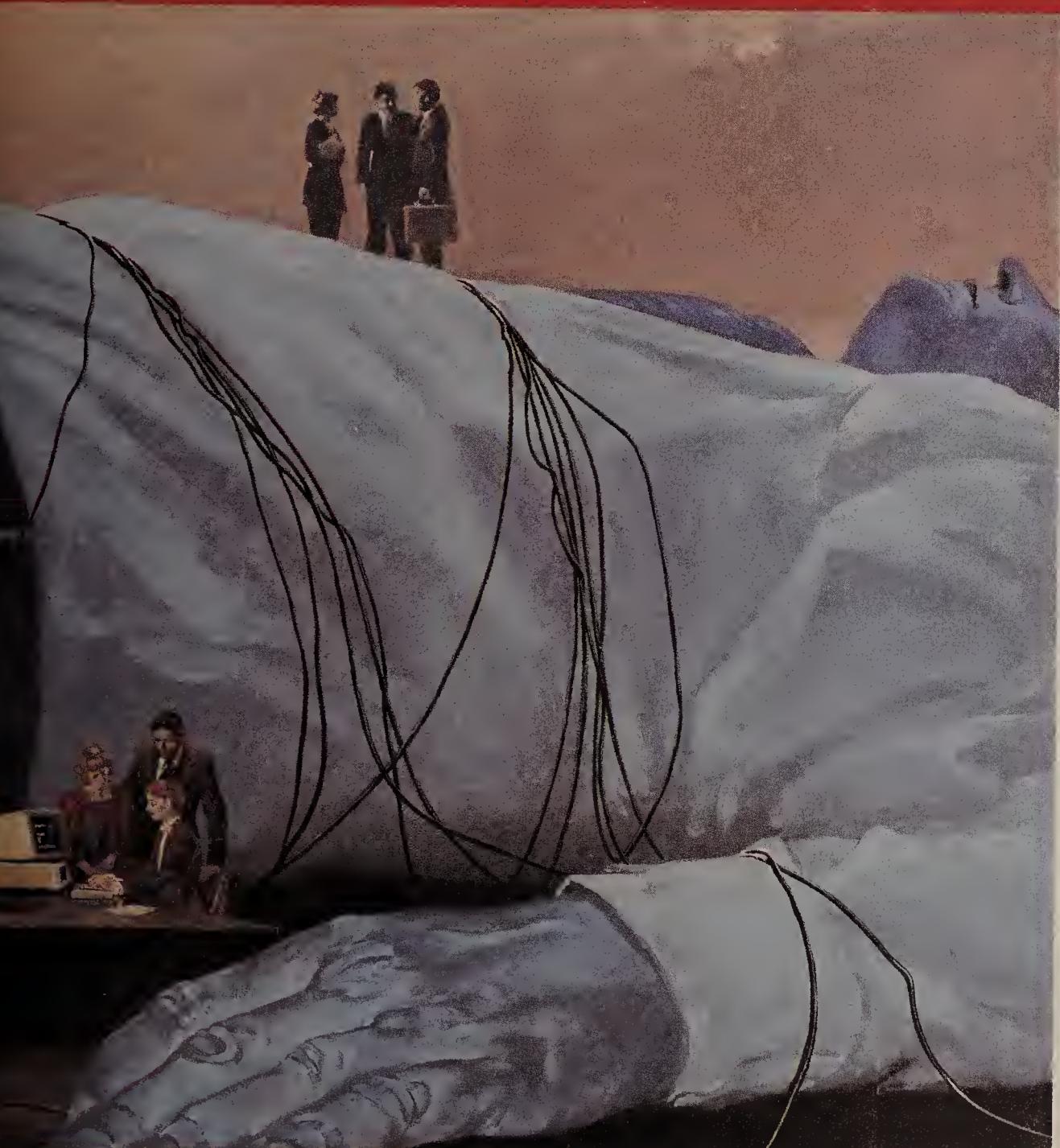
DOS programs

User companies planning to run existing DOS programs on servers using OS/2 and Unix might be disappointed with the results, especially if the server is RAM-limited, since OS/2 and Unix Release 3.0 use demand-paging techniques for handling applications. With paged systems, the program is divided into fixed-size segments, or pages, which reside both in RAM and in virtual storage areas on disk. The active pages — the ones doing the processing — are held in RAM, and the others are paged in from disk as needed.

That arrangement works fine, provided enough RAM exists to hold everything that should be resident and that applications have been structured to reduce the need for excessive paging. However, as more jobs are added, there may not be enough RAM to accommodate all resident pages required.

(continued on page 83)

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W.C. Wise, Ph.D.
Assistant to the Vice President for Academic
Information Management, Medical University of South Carolina

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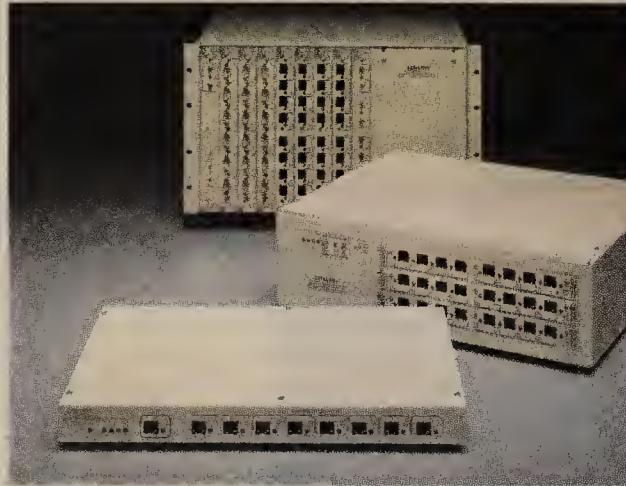
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Just imagine what you could save in time and money by installing Ethernet without having to run coaxial cable throughout your building.

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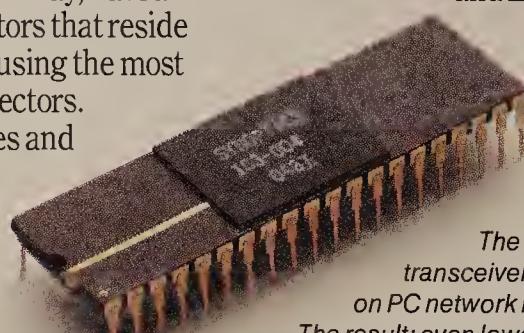
SynOptics Communications makes concentrators in three sizes to economically accommodate network growth, from very small to very large.

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France's public packet net director talks about Infonet's PTT partnerships and the future of international data networks.

For Transpac's Gerard Simonet, business comes before politics

Gerard Simonet is director general of Transpac, operator of the world's largest public packet-switched network.

Transpac, which reported 1987 revenues of nearly \$400 million, is a subsidiary of Cogecom, which in turn is France Telecom's subsidiary for new communications businesses.

Prior to his appointment at Transpac, Simonet was president-director general of Interpac, Transpac's international subsidiary. In July 1988, Transpac purchased a 15% interest in the U.S.-based Infonet International value-added network (VAN) system. Simonet now oversees the development of Transpac's international operations.

Simenet was interviewed at the Tour Montparnasse in Paris by Bruce Page, president of Magnetic Press, Inc., a New York-based research firm specializing in emerging information and communications technologies.



What will be the impact on Transpac of acquiring 15% of Infonet?

Transpac's subsidiary, Interpac, was formerly the French distributor for [Infonet Computer Sciences Corp.]. Now, Transpac has a stake in Infonet, and Interpac will be Infonet's French distributor.

I want to underline this point: It is much more satisfactory to us to have not just a distributorship but a distributorship in a company

in which we have a stake.

With the international agreement, traffic should grow at a faster pace. There's a rule of network management in operation here.

When you have N partners in a network, traffic on your net grows by N squared. Thus five extra partners should bring 25 times the traffic onto Infonet. The idea is that with this increased traffic, every partner's traffic will rise faster than it

would have without the venture.

What will be the relation between Infonet's local and international networks?

Infonet is both the international backbone network and also the local affiliate network in the U.S. Generally, each country has one node for interconnecting into the international network. Each country has an Interpac-like structure for marketing the inter-

(continued on page 68)

(continued from page 67)

national services and for support of the international customer base. To some degree, that base of customers overlaps with our existing customers, most of which are the large multinational companies.

We could also eventually build local packet networks in countries in which Infonet does not have a local operating partner.

By getting involved, the PTTs have joined hands, but each has kept a free hand. We each have our private networks in our own countries, plus each of us is working for the common good of all.

This is also the first time you see the PTTs entering as entrepreneurs to create a new multinational company. Politics have nothing to do with this. It's just business.

Finally, we are happy that an American company is now in a partnership with a European company. America has by far the biggest market for telecom services, and this consortium gives us a chance to participate in the American market.

How much international business do you foresee?

We expect three economic benefits from the new joint venture:

We expect increased revenue from Interpac, which is 60% owned by Transpac. We also expect the increasing profit of Infonet to generate an increasing dividend for Transpac. Finally, we expect it to bring additional traffic onto Transpac.

"This is also the first time you see the PTTs entering as entrepreneurs to create a new multinational company. Politics have nothing to do with this. It's just business."



Transpac will have revenue of about \$400 million this year, and we forecast revenue growth for the coming years at about 15% to 20%. Our real growth, however, is higher. For the past three years, we have been cutting our tariffs, and our revenues have still grown. We want to show our customers that the amount of applications they have on Transpac can grow without their bills growing.

Today, Transpac carries 1.5 trillion characters of data per month. If you put the same question to Telenet [Communications Corp.] or Tymnet, each would probably answer they are carrying about 200 billion characters. Germany would probably claim around 400 billion.

Why is Transpac so busy? It was the first commercial X.25 network, and it implemented a complete CCITT standard X.25. Other packet networks that may have started sooner had some proprietary implementations of the X.25 standard. Because our network was completely standard, people could adopt it with confidence.

It's also a question of mentality. In Europe, people don't care about giving their

data traffic to a public company. In the U.S., I think companies prefer to have their own networks for reasons of privacy and security.

What are Transpac's strategic reasons for getting into this partnership?

If we remain a supplier merely of basic services like circuits and allow other multinational companies to play in all the value-added services, we lose out on the growth in that market. We don't want to remain merely a provider of fundamental, basic services.

People have been unanimous in their endorsement of value-added network services. But you have to have the necessary infrastructure, which has to be international. Who is able to do that kind of thing? IBM, DEC, [GE Information Services] and

others like them today are the only entities that have the switches, lines and computers to operate international VANs. If we want to compete with them, we must start with the network, then add value to that. The new Infonet has that kind of network in place.

Would it be possible for West Germany, France or the UK to create their own international networks?

No, because the cost of getting started in the U.S. is too high, both in dollars and in terms of market resistance. Second, there would be a tendency for West Germany to make networks in France, France to make networks in West Germany and so on. Nobody wants that. Third, worldwide experience is necessary, especially in terms of manpower support. Infonet has that experience. This consortium was the

only solution for the telecom agencies to be able to play in worldwide markets. None of us could have done this ourselves.

Why couldn't you simply use the international packet-switching system to create a worldwide packet network?

Because it is not managed from a single point, it isn't billed from a single point, and it isn't sold from a single point. These days, an international VAN must offer all these things.

When the CCITT thought up the X.75 internetwork packet protocol, they had in mind for data processing what had worked with the telephone and telex. But data processing is much more complicated.

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ply in the telephone environment. You can't rely on just an ad hoc solution when you want to establish a permanent data network. In the past, to satisfy their needs, companies would go to the big multinationals like IBM to share time on their networks.

What about liberalization in the French telecommunications market? Is the French VAN market big enough for more than one competitor? It is said, for example, that Alcatel N.V., which manufactured the packet switches for Transpac, will soon begin to operate a packet net of its own.

Companies like Alcatel are, of course, perfectly able to operate a packet network in France. But as a manufacturing company, they want to get their money back as quickly as possible so they can invest it in

research and development. As a network operator, however, you have to wait several years for your return on investment. For this reason, I believe Alcatel is not a serious potential competitor in the VAN market.

Others, like IBM, could get involved in this. IBM has a big customer base and a lot of money to invest in a long-term networking project. What they don't have perhaps is expertise in data communications. Could IBM offer an X.25 networking service today? I don't know. But I think IBM is not interested in offering basic services so much as enhanced data services, such as [electronic data interchange].

Sooner or later, I believe there will be telecom deregulation around the world. I think it will take time, but one day competition will be a fact of life worldwide. My personal opinion is that the telecom oper-

ators have to really tackle the problem to evolve faster than the market itself.

The agreement with Infonet shows that the PTIs are actually able to anticipate the needs of the market.

Looking into the future, what are Transpac's principal growth areas?

We have three main areas for diversification. The first is to expand geographically. We've done this with the Infonet agreement. This gives us a wider scope of operations.

The second main growth area for us is in value-added services. The first stage in the evolution of data networks was time-sharing, where companies would share time on a host computer, connecting their offices with the host by means of a data network. While the time-sharing concept has lost currency, there's still a demand

for dedicated communications services to connect computers. This is the fastest growing part of the VAN market today: the use of data networks for exchanging data.

Our expectation for the next five years is that message handling systems [MHS] and electronic data interchange [EDI] will become the profit centers for VAN operators. It's not a market that we can tackle right now. But in this business, you have to always be planning five years out.

We think the MHS and EDI markets are going to start domestically first. Then international applications will open up. One day, VANs are going to be very huge markets because of these applications. In the past 20 years, companies have made huge investments to improve their internal communications, computing and so on. But nothing has been done so far in terms of intercompany communications. You still put typed invoices in the mail.

In the coming 30 years, the huge growth will be in intercompany connectivity. There are several problems that must be faced before this can happen. For example, there must be standards, people's attitudes about using computers must change, and courts must accept electronic evidence as valid. While these are large barriers, some analysts estimate that between 5% and 7% of any company's revenues are used to handle the ordering, invoicing and payment processes.

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product] is spent on intercompany communications. Any electronic document interchange application that addresses this market has potentially huge revenues. This market probably represents the second wind for data processing companies, which are not progressing as they did in the past.

The third area for our diversification is in virtual private packet networks, or hybrid networks. We have built several networks for companies such as banks, which have a large number of computer terminals in a relatively dense concentration surrounding a metropolitan area. The customer pays a flat rate per month, rather than a variable rate based on usage.

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By MIKE MOISAN

Any manager faced with choosing, installing and operating a network faces risks. T-1, with its relative newness, is often regarded by managers as riskier than other technologies. Asking the right questions — and getting the right answers — can help keep managers' choices of T-1 applications, vendors and implementations from being a big gamble.

Two of the first questions to ask are "What benefits are expected from the network?" and "Are you sure that T-1 is the most efficient way to get these benefits?"

Be certain of your network analyses. Make sure that a T-1 network is the most efficient way to derive the benefits you expect, such as better bandwidth management and higher throughput. With some features — for example, alternate routing — another technology, such as fast packet switching, may be better. But once you've decided on installing a T-1 network, you will still have many questions to answer.

■ How do you choose a vendor?

Investigate the claims of any vendors you are considering. Ask for their list of customers and

Moisan is a senior communications network analyst with Information and Communication Systems, Inc., a division of Carson Pirie Scott & Co., a retailer based in Chicago.



contact names. You may also want to consider a site visit and talk to their customers first-hand. If you put out a request for proposal, make sure that any proposals you receive address all your specifications. Make sure that

your evaluation and choice of vendor provide you with all the functionality for today, two years from now and five years from now.

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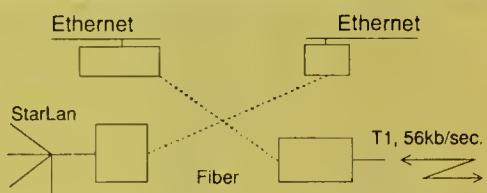
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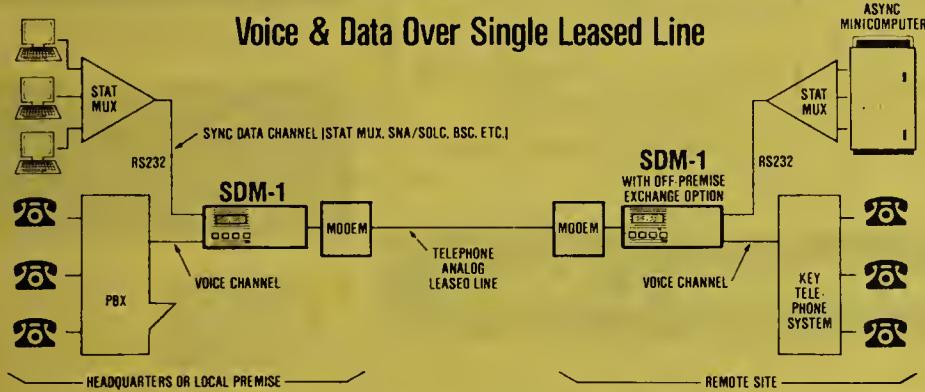
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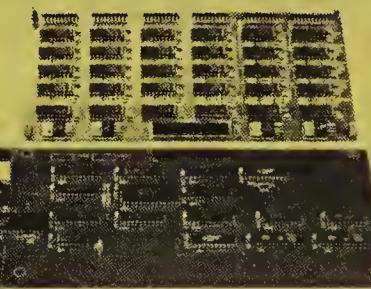


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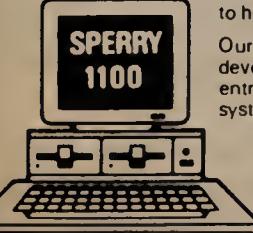
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For over fifteen years, General DataComm has been a pioneer and recognized leader in data transmission products and systems. Our comprehensive systems approach to product design ensures that each piece of equipment—from modems to multiplexers, from concentrators

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You're a high energy marketing professional with a Bachelor's degree (MBA preferred), 8-10 years' product marketing or sales background and strong management skills. You're experienced with new product definition and introduction and existing product enhancement. You're organized and detail-oriented and know the ropes when it comes to product development. You're familiar with the T1 market, its players, products, and strategies. You want to share the success of the product line in a team environment. If this sounds like you—we'd be interested in talking to you.

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If you have the background we're looking for, please call Mr. Drew S. Arnold, Manager, Corporate Staffing, at (203) 547-1118, ext. 6913, or send your resume, including salary requirements, to his attention at:

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O'CONNOR, O'CONNOR, LORDI, LTD.
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(412) 276-5070

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WASHINGTON, D.C.: 3022 Javier Road, Suite 210, Fairfax, VA 22031; Katie Kress, Regional Manager, 703-573-4115; Pauline Smith, Account Executive 800-343-6474.

CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018; Patricia Powers, Regional Manager, 312-827-4433; Ellen Casey, Account Executive 800-343-6474.

LOS ANGELES: 18004 Sky Park Circle, Suite 100, Irvine, CA 92714; Barbara Murphy, Regional Manager, 714-250-0164; Chris Glenn, Account Executive, 800-343-6474.

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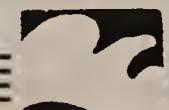
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COMPUTER SYSTEMS ANALYST GS-334-13

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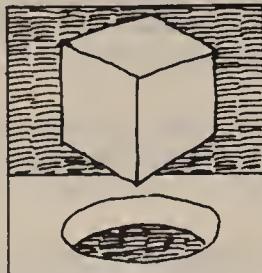
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For all the facts on putting the Computer Careers Network to work for you - regionally or nationally - call the sales office nearest you. Or contact John Corrigan, Recruitment Advertising Sales Director, at 617-879-0700.

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John Corrigan, Recruitment Advertising Sales Director, 508-879-0700

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It's the efficient way to recruit qualified computer professionals.

Now you can target your recruitment advertising to the qualified computer professionals you want to reach - where you want to reach them. All you need is the new IDG Communications Computer Careers Network. Here's how it can work for you:

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NEW YORK: Paramus Plaza I, 140 Route 17 North, Paramus, NJ 07652, (201) 967-1350;

WASHINGTON: 3022 Javier Road, Suite 210, Fairfax, VA 22031, (703) 573-4115

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ANALYSTS

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SR ANALYST/PROG

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(C.A.B.S.)

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PROGRAMMER/ANALYST

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Due to business growth and heavy new systems development, Kraft Food Ingredients (KFI) has openings for two Programmer/Analysts to work with our manufacturing and marketing project teams. Successful candidates will be those who enjoy a fast-paced, challenging environment. A minimum of three years programming and analysis experience in a System/38 environment is required. KFI presently has a System/38 Model 600, and will be migrating to an AS/400 Model B60 in early 1989.

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Integration: A sample of vendor products and strategies

Chart 1

	Digital Equipment Corp.	Wang Laboratories, Inc.	IBM	Hewlett-Packard Co.	AT&T
Umbrella strategic architecture	PCSA	TIES	SAA	NewWave	SimulTask
PC integration product group	VMS services for MS-DOS	PC/VS integration services	PC support	Business System Plus/3000	6386 Work Group System
Minicomputer and operating system to be integrated	VAX running VMS	VS7000s running VS OS	AS/400 running OS/400	HP 3000 running MPE	PC 6386 supermicrocomputer running Unix and DOS
DOS 3.1 file server	VAX VMS services for MS-DOS	IWS CORE	SRPI/ECF (virtual disk service only)	Cooperative services	Starlan Server
PC/minicomputer-integrated applications	PC Network integration packages (currently MS/Windows, file transfer, printing)	LAN Office, PC WP Plus, PC Infosharer, Advanced Printing Services	Organizer (integrated user interface)	Vectra Office Professional, Information Access	Under development

AS/400 = Application System/400
 IWS CORE = Intelligent Workstation CORE
 PCSA = Personal Computing Systems Architecture
 SAA = Systems Application Architecture
 SRPI/ECF = Server-Requester Programming Interface/Enhanced Communications Facility
 TIES = Technology for Integrating End-User Systems

SOURCE: NETWORK STRATEGIES, INC., FAIRFAX, VA.

Remodeling the LAN market

continued from page 62

In addition, LAN Office is automatically linked to VS Office packages running on any VS attached to the local-area network. The Wang Office implementations are transparently tied together, sharing a single mailing address space, linked directories and a common user interface. But LAN Office storage and communications stay on the local-area network unless addressed to off-net destinations; much of the LAN Office processing is off-loaded to the personal computer.

LAN Office is an example of a minicomputer application that was ported to the personal computer local-area network but still maintains its connections to the host version. Wang and DEC are announcing more such packages, including distributed printing services, shared file conversion and transfer services, and, perhaps most significantly, common data base management systems. In all likelihood, we will see many more such cooperative process-

ing packages as third-party vendors take advantage of the integrated personal computer/minicomputer processing platforms created by minicomputer manufacturers.

Minicomputer vendors are taking these integration products to market with a three-part strategy:

- Provide a minicomputer-based local-area network operating system;
- Offer integrated applications for other local-area network operating systems; and
- Sell inexpensive micro/minicomputers and low-end minicomputers (for example, the Micro-VAX) as local-area network servers.

Integrating existing LANs

To address existing local-area networks and local-area network operating systems, vendors are offering some of their new integrated applications and utilities (for example, Wang's LAN Office and terminal emulation) as separate products that run over other vendors' local-area network operating systems, such as NetWare, 3+ and VINES. Chart 3

on this page illustrates an example configuration.

The integrated applications, which run over the NETBIOS or DOS 3.1 interfaces offered by almost all local-area network oper-

ators, will become just another server on the local-area network.

However, since the minicomputer does not itself run other vendors' local net operating systems, minicomputer-to-personal computer communications must go through the gateway personal computers. These personal computers run both the local-area network operating system and minicomputer transport and internetwork protocols. The gateways may also perform some of the application processing themselves.

Personal computer local-area network users can keep their NetWare or 3+ interfaces, servers and applications.

This configuration may be particularly beneficial if the minicomputer proves to be a slow file server or if users have already invested significantly in a personal computer local-area network operating system.

At the low end

A third approach to the personal computer local-area network market is for the minicomputer vendor to offer inexpensive, scaled-down versions of its departmental processors that require little or no operator sup-

port. Examples include DEC's MicroVAX, Wang's new VS 5000 and the low end of IBM's Application System/400 line.

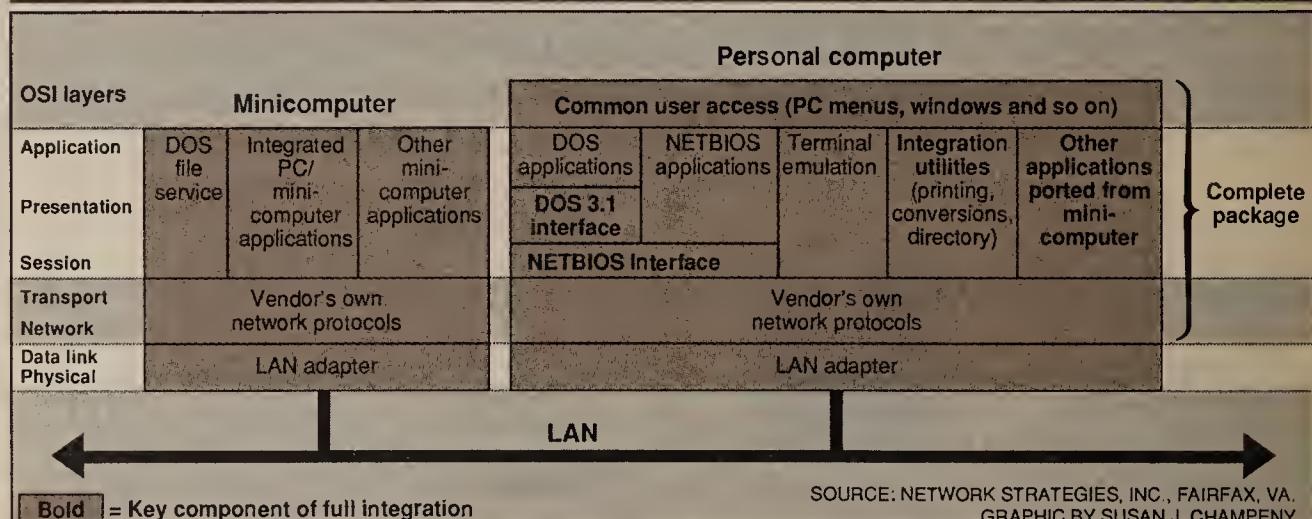
With the new integration capabilities, vendors hope these systems will be attractive to local net systems integrators as dedicated, specialized servers (data base servers and communications servers) — an alternative to DOS-based and personal computer-based servers.

Within the next two years, we will see another set of integration products and strategies based on operating systems that span both the workstation and departmental processing platforms. Operating systems such as Unix and OS/2 will provide completely seamless integration of personal computers and minicomputers, and the distinction between the two will gradually disappear. Third-party vendors, in addition to minicomputer vendors, will be able to provide the integration packages.

Over the long term, from an architectural perspective, the

PC components of a minicomputer-based LAN operating system

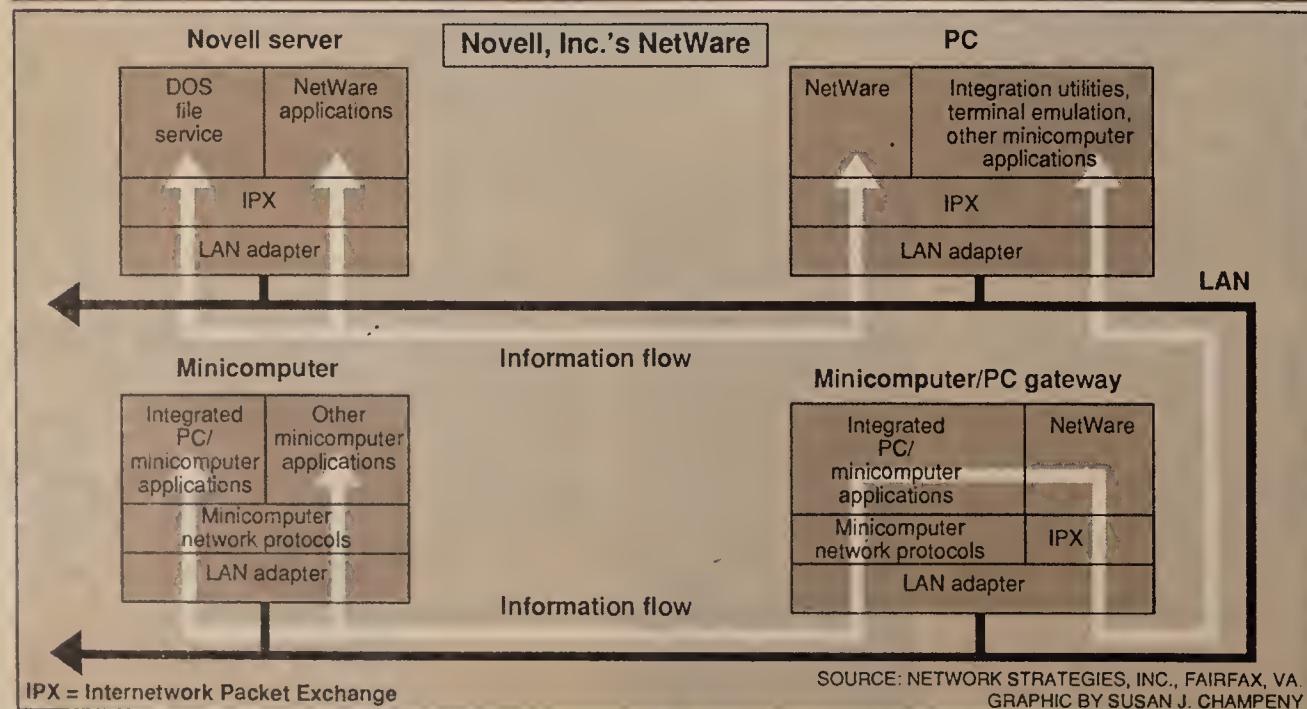
Chart 2



SOURCE: NETWORK STRATEGIES, INC., FAIRFAX, VA.
 GRAPHIC BY SUSAN J. CHAMPEY

Integration with a server-based LAN operating system

Chart 3



SOURCE: NETWORK STRATEGIES, INC., FAIRFAX, VA.
 GRAPHIC BY SUSAN J. CHAMPEY

NETWORK WORLD • SEPTEMBER 26, 1988

NETWORK WORLD

Local-area network servers

Vendor	Product	Compatible LAN	Maximum ports (serial/parallel)	Operating system	RAM size (bytes)	Memory cache size (bytes)	Minimum RAM for system software (bytes)	Micro-processor/clock rate	Memory/channel bus width (bits)	Disk capacity (bytes)	Disk seek time (msec)	Disk transfer rate (bit/sec)	Tape backup capacity (bytes)	Minimum/maximum price
Alloy Computer Products, Inc. Framingham, Mass.	Cluster Plus	Ethernet, token ring, 10NET, Arcnet, AlloyNet	2/3	MS-DOS 3.3 and NetWare	640K to 16M	8M to 15M	200K to 1M	Intel Corp. 80286/NA	16/16	150M to 600M	16 to 27	10M	120M	\$15,000/\$28,000
Apple Computer, Inc. Cupertino, Calif.	AppleShare File Server	LocalTalk, EtherTalk	None/none	Macintosh OS	1M to 4M (Mac Plus & SE); 1M to 16M (Mac II)	3M to 15M	1M	Motorola Corp. 68020/NA	32/32	20M to 43M	NA	NA	40M	\$3,600 for Model SE, \$6,300 for Mac II, \$3,700 for Mac Plus
AT&T Basking Ridge, N.J.	Starlan 6386 WorkGroup System	Ethernet, Starlan, token ring	33/9	Unix System V/386, Release 3.1, 3.2, MS-DOS 3.2, OS/2, Microsoft Corp.'s Xenix	1M to 16M	12M	4M	Intel 80386/16M or 20MHz	32/32 or 16	8M to 33M (for 20MHz); 40M to 135M (for 16MHz)	20 or 30	5M (40M and 60M disk); 10M (80M, 135M, 300M disks)	40M, 60M, 125M	\$4,800 (16MHz, 40M disk) to \$6,400 (16MHz, 135M disk); \$6,000 (20MHz, 80M disk); \$11,400 (20MHz, 300M disk)
	Starlan 3B2, Model 700 Server	Starlan, Ethernet	90/11	Unix System V, Release 3.2	8M to 64M	None	8M	Western Electric 32200/22MHz (up to 4 microprocessors per server)	32/32	600M to 15.9G	18	12M to 36M	40M, 60M, 120M	\$64,000/\$69,000
Banyan Systems, Inc. Westborough, Mass.	Corporate Network Server	Ethernet, token ring, VistaLAN, LANStar	30/NA	Unix System V, Release 3	4M to 24M	32K	4M	Intel 80386/20MHz	32/16	80M to 2.5G	20	NA	150M	\$32,000/\$94,000
	Desktop Server	Ethernet, token ring, VistaLAN, LANStar	30/NA	Unix System V, Release 2	2M to 5M	None	2M	Motorola 68000/NA	16/16	52M to 146M	20	NA	16M	\$13,000 average
Compaq Computer Corp. Houston	Deskpro 386/25	Ethernet, token ring, Arcnet, Novell, Inc. NetWare, 3Com Corp. 3+	2/2	MS-DOS 3.3, OS/2	1M to 16M	512K	2M plus network control software	Intel 80386/25MHz	32/16	110M to 1.2G	18 to 25	3.5M	13M or 40M	\$13,000/NA
Convergent Technologies, Inc. San Jose, Calif.	SPC Model 100	Ethernet, token ring	28/none	Unix System V, Release 3	2M to 12M	None	2M	Intel 80386/20MHz	32/32 or 16	40M to 405M	18 to 23	26.4M	60M to 150M	\$9,000/\$21,000
	Server PC Model 200	Ethernet, token ring	43/none	Unix System V, Release 3	4M to 64M	64K	2M	Intel 80386/16MHz	32/32 or 16	80M to 975M	18 to 28	26.4M	60M to 150M	\$12,000/\$75,000
Data General Corp. Westborough, Mass.	MV Family Super Minis	DG/PC Integration, Rational Data Systems' PC/VS	12 to 1,000/12 to 1,000	AOS/VS	4M to 64M	NA	4M	Proprietary/NA	NA/NA	12M to 20G	12 to 20	14M	163M	\$10,000/NA
DSC Nestar Systems, Inc. San Jose, Calif.	Planstar	Arcnet	None/none	Starplus Plus	1M	None	512K	Motorola 68000/12 to 16MHz	16/16	68M to 1.1G	25	1.5M	150M	\$8,000/\$10,000
	NEXOS 386 Server	Ethernet, token ring, Arcnet	5/2	NEX/OS	2M to 16M	8M	640K	Intel 80386/20MHz	32/16	70M to 1.4G	26	2M	60M to 150M	\$15,000/\$25,000
EasyNet Systems, Inc. Mississauga, Ontario	EasyServer	Any NETBIOS	1/1	MS-DOS 3.X	640K to 4M	None	240K plus network control software	Intel 80286/12MHz	16/16	40M to 200M	28	NA	60M to 130M	\$7,300/\$12,000

Arcnet = Datapoint Corp. Arcnet
LANStar = Northern Telecom, Inc. LANStar
NA = Information not available

NETBIOS = Network Basic I/O System
Starlan = AT&T Starlan
OmniNet = Corvus Systems, Inc. OmniNet

10NET = 10NET Communications 10NET
VistaLAN = Allen-Bradley Co. VistaLAN

(continued on page 84)

The engine of the local-area network

continued from page 65

If the application developers do a good job optimizing the applications, performance problems will be greatly diminished. If not, an inordinate amount of paging will occur, and performance will suffer. "I think most users will add more RAM if operations degrade," says Denna Osborne, LMX product manager for HP in Fort Collins, Colo. That's probably so, provided more RAM can be accommodated. But, as the comparison chart shows, most servers top out at 16M bytes, minus

4M bytes for the operating system and whatever else is needed for network control and any other systems software needed to make the local network run.

Current DOS applications will run with no changes under both OS/2 and Unix in compatibility mode. With OS/2, the applications reside in a protected memory region, called a compatibility box, and are not paged, while Unix uses paging. With either operating system, the DOS applications cannot take advantage of the more advanced operating system features, such as multitasking, but they can use the networking facilities.

Users also may not be able to

jump between OS/2 and Unix applications. According to HP's Sherwood, users will have to log off and reboot the system when moving between OS/2 and DOS. Microsoft couldn't be reached to confirm or deny that, however.

In summary, when evaluating a local-area network server, don't be distracted by such performance "sacred cows" as disk-access time, I/O bus widths, data-transfer rates and microprocessor speeds.

While those are important, remember that inefficient systems and application software will degrade even the quickest hardware, and that can't be measured without benchmarking. □

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THE ENGINE OF THE LOCAL-AREA NETWORK

NETWORK WORLD

Local-area network servers (continued from page 83)

Vendor	Product	Compatible LAN	Maximum ports (serial/parallel)	Operating system	RAM size (bytes)	Memory cache size (bytes)	Minimum RAM for system software (bytes)	Micro-processor/clock rate	Memory/channel bus width (bits)	Disk capacity (bytes)	Disk seek time (msec)	Disk transfer rate (bit/sec)	Tape backup capacity (bytes)	Minimum/maximum price
Faultnet Technologies, Inc., East Kingston, N.H.	286/386 Server	Ethernet, token ring, Arcnet, Starlan, VistaLAN	9/6	NetWare or Banyan VINES	1M to 16M	3M	1M	Intel 80286/10MHz or 12MHz; Intel 80386/20MHz or 25MHz	16 for 80286; 32 for 80386/16 for 80286; 32 for 80386	72M to 1.4G	28	500K	60M or 120M standard; up to 400M optional	\$12,300 (no disk)/\$50,000 (with 288M disk)
Hewlett-Packard Co., Cupertino, Calif.	HP Vectra RS/16PC	Ethernet, token ring, Starlan	1/1	HP Vectra DOS 3.3, OS/2, Xenix 386	1M to 16M	1M	2M	Intel 80386/16MHz	32/16	40M to 100M	17	7.5M	40M	\$6,600/\$8,500 (with 310M bytes of disk)
	HP Vectra RS/20PC	Ethernet, token ring, Starlan	1/1	HP Vectra DOS 3.3, OS/2, Xenix 386	1M to 16M	1M	2M	Intel 80386/20MHz	32/NA	40M to 620M	17	7.5M	40M	\$7,200/\$11,600 (with 310M bytes of disk)
Hyundai Electronics America, Santa Clara, Calif.	Super 286 File Server	Ethernet, token ring	1/1	MS-DOS 3.2	1M to 4M	None	1.5M	Intel 80286	16/16	40 to 120M	28	NA	None	\$2,000/\$30,000 (with 40M byte disk)
IBM, Rye Brook, N.Y.	Personal System/2 Model 60	Token-Ring or PC LAN	3/1	OS/2 and PC DOS 3.3	1M to 15M	128K to 14M	1M to 3M	Intel 80286/10MHz	16/16	44M to 159M	30 or 40	NA	Tape and 200M optical disk	NA
	Personal System/2 Model 80	Token-Ring and PC LAN	3/1	OS/2 and PC DOS 3.3	1M to 16M	128K to 15M	1M to 3M	Intel 80386 (16 or 20 MHz)	32/32 or 16	44M to 314M	23 to 40	19M	Tape and 200M optical disk	NA
NCR Corp., Dayton, Ohio	PC 916	Any	1/1	Any	2M to 8M	None	Depends on operating system	Intel 80386/4.77MHz to 16MHz	32/8 or 16	30M to 70M	30 to 40	NA	NA	\$5,000/\$7,500
Novell, Inc., Provo, Utah	386 AE/155x2	Ethernet, token ring	2/1	NetWare	4M to 16M	12M	2M	Intel 80386/16MHz	32/32 or 16	155M to 2G	16	NA	120M	\$9,000/\$14,000
	386 AE/320x2	Ethernet, token ring	2/1	NetWare	4M to 16M	12M	2M	Intel 80386/16MHz	32/32 or 16	320M to 2G	16	NA	120M	NA
Racore Computer Products, Inc., Los Gatos, Calif.	LANpac 386	Ethernet, token ring	2/1	Unix, Xenix, MS-DOS, OS/2	2M to 16M	None	Depends on operating system	Intel 80386/16MHz or 20MHz	32/8 or 16	80M to 360M	NA	4.29M	60M to 120M	\$5,000/NA
Sytek, Inc., Mountain View, Calif.	Model 4430 Network Server	Ethernet, Sytek 6000	1/2	NetWare	Up to 2.5M	NA	1M	Intel 80386/16MHz	32/8, 16, 32	135M	16.5M	NA	125M	\$11,500/\$14,000
The Network Connection, Inc., Alpharetta, Ga.	Triumph	Ethernet, token ring, Arcnet, Starlan, VistaLAN	2/3	MS-DOS 3.3; OS/2; Microsoft LAN Manager; Novell NetWare; Unix Version V, Release 3	1M to 16M	Up to 16.5M	2M to 4M (depending on operating system and network control software)	Intel 80286/10MHz or 12MHz; Intel 80386/16M, 20M, or 25MHz	16 (80286) and 32 (80386)/16 (both processors)	20M to 2.64G	0.6	1M	10M to 2.2G	\$6,800 (for 130M disk)/\$19,600 (for 2.6G disk)
3Com Corp., Santa Clara, Calif.	3S/200	Ethernet, token ring	5/2	3Com 3+	2M to 3M	2M	1M	Intel 8186/8MHz	16/8	106M to 900M	28	10M	150M	\$8,500/\$10,500
	3S/400	token ring, AppleTalk	12/2	3Com 3+	2M to 14M	13M	1M	Intel 80386/16MHz	32/16	150 to 900M	16	10M	150M	\$12,500/\$14,500
Univation, Inc., Milpitas, Calif.	Univation 386	Ethernet, Arcnet, Sytek (broadband), Omnitel, any NETBIOS	1/1	LifeNet	2M to 16M	900K to 15M	1M	Intel 80386/NA	32/16	80M to 170M	20	2.8M	60M	\$7,000/14,000
	LifeServer 386	Same as Univation 386	1/2	LifeNet	2M to 16M	900K to 15M	1M	Intel 80386/16MHz or 20MHz	32/16	170M, 300M or 600M	20	2.8M	60M	\$17,000/\$27,000
Wang Laboratories, Inc., Lowell, Mass.	LS-100	Ethernet, token ring, VistaLAN, LANStar	4/3	Unix Version V, Release 3	4M to 24M	NA	4M	Intel 80386/20MHz	32/16	150M	NA	NA		\$21,000/\$30,000
	LS-50	Ethernet, token ring, VistaLAN, LANStar	2/2	Unix System V, Release 3	4M to 16M	None	4.5M	Intel 80386/20MHz	32/16	68M to 136M	NA	NA	60M to 150M	\$11,000/\$17,000
Xerox Corp., Stamford, Conn.	Xerox 8000 Series	Ethernet	4/1	Pilot proprietary	512K to 3.6M	None	512K	Proprietary/7.3MHz	32/NA	10M to 2.1G	25 to 70	4M	48M to 130M	\$10,000/\$24,000 (includes 310M disk)
Zenith Data Systems Mt. Prospect, Ill.	Z-LAN 500 File Server	Token ring, Arcnet, Ethernet	1/none	Novell NetWare 286 Advanced 2.1	1M to 16M	None	640K	Intel 80386/16MHz	32/16	40M to 160M	18	NA	NA	\$2,700/\$8,000

Arcnet = Datapoint Corp. Arcnet
 LANStar = Northern Telecom, Inc. LANStar
 NA = Information not available
 NETBIOS = Network Basic I/O System

Starlan = AT&T Starlan
 Omnitel = Corvus Systems, Inc. Omnitel
 10NET = 10NET Communications 10NET
 VistaLAN = Allen-Bradley Co. VistaLAN

This chart includes a representative selection of vendors in the local net server market. Most vendors offer other local net servers, and many vendors not included offer a full range of competitive products.

SOURCE: TMS CORP., DEVON, PA.

T-1: question of skill or game of chance?

continued from page 71

network operating? Do you want total manual intervention, completely automatic intervention or something in between? If you choose something in between, have you decided to what degree and at what points you want your operators to take over control from the multiplexer?

There are several ways that a T-1 network may be managed. While a totally manual operation provides the capability to "control your own destiny," it also carries with it the dedicated operator requirement.

This may not be a concern while your network is small, but as your network grows, the situation may become too much for one person to maintain. It may become totally unmanageable, at which point you will need to consider another alternative for network management.

If you consider a totally automated solution, bear in mind that you are placing the availability of your network completely in the hands of a system that makes its network and routing decisions based on what the vendor thinks is the best way to operate. There is nothing wrong with this so long as your network and routing decisions match those of the vendor.

There may come a time when it is no longer possible to take down your entire network for upgrades and some other approach will be required.

▲▲▲

Another point to ponder regarding the choice of a totally automated solution has to do with front-end processor connectivity. Consider a scenario in which the multiplexers have rerouted the network due to a T-1 failure. It so happens that the rerouting has placed all of the links connecting two front-end processors over the same T-1 and this T-1 fails. Chances are you will either lose the front end completely or it will come back up over slower speed links. In either case, the effects, especially in a large data environment, can be devastating.

The choice of something in between gives you the ability to manually intervene when the multiplexer notifies the operator of a network problem, such as a T-1 outage. One check an operator can make is to ensure that the links connecting front-end processors are diversely routed.

This choice also reduces operator involvement, thereby releasing the operator for other duties.

■ How does the vendor intend to keep your system up to date? How will the upgrades be performed? How much downtime will be experienced to perform the upgrade?

How the vendor plans to keep your system current is an issue that requires a complete understanding and agreement not only between you and the vendor but

among all the divisions in your organization that plan to use the network. If the only way that the system can be upgraded is to take it completely down, then you will probably want to do it during off-hours.

made to accommodate off-hour users. One option is to establish a maintenance window that opens only when the network is least utilized. If the network's complexity is such that it covers multiple time zones,

willing to perform upgrades outside normal business hours?

If the only way for the vendor to perform upgrades is to take down the network, find out what steps, if any, the vendor is taking to change this. There may come a time when it is no longer possible for you to take down your entire network for upgrades and some other approach will be required. Perhaps you could adjust processing schedules to minimize the impact of the outage.

■ Who has the responsibility for resolving disputes regarding upgrades when scheduling conflicts arise?

Whatever your decision regarding scheduling downtime to perform upgrades, it must be one that is agreed upon by all parties concerned. If you market your excess network capacity to clients (continued on page 87)

How does the vendor intend to keep your system up to date? How will the upgrades be performed?

▲▲▲

Taking your network completely down may not be a problem as long as it is not used 24 hours a day. If you have a 24-hour operation, then arrangements must be

then you may need a "floating" window. ■ If the upgrade is labor-intensive, what steps is the vendor taking to improve upon this issue? Is the vendor

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5. Can your network *recover* from a disaster on its own? Yes No
6. Does your network management maximize performance and control? Yes No

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(continued from page 85)

outside your organization, then you may want this agreement to be a binding legal document. When issues regarding network downtime arise, those individuals responsible for resolving disputes among users need to be very knowledgeable about the user's environment.

For example, in the brokerage industry there is a situation known as "triple witching Friday." On this day, a significant amount of activity takes place across all three disciplines — stocks, commodities and options. If those individuals in charge of taking the network down were not aware of this situation, serious problems might result for brokers using the network.

■ What additional costs, if any, will you incur for nonprime-time upgrade service?

Find out if you will be charged for new releases of hardware or software. If you are charged, find out from the vendor if it is on a migration basis from one release to another or if you are also charged for bug fixes within a release. There may be a labor charge for nonprime-time, non-failure-related work as well as a charge for the upgrade.

You will need to decide whether or not the additional charges, if any, are worth the expense. Make sure you know what you are getting for the monthly maintenance charges you are paying.

Find out from the vendor how often the technicians are brought back for retraining or updating on existing and new equipment.



■ How expert are your vendor's technicians? How often and at what point are the technicians brought back to headquarters for refresher courses or training on new products?

The level of expertise of the technicians is crucial to both efficient problem resolution and system upgrades. Find out from the vendor how often the technicians are brought back for retraining or updating on existing and new equipment. In the areas of new equipment and software, find out the time lag between the training and availability of the new releases. If it seems to you to be an inordinately long amount of time, it probably is.

Most people tend to forget what they learn if they do not have an opportunity to exercise the new knowledge in a relatively short period of time.

Finally, make sure the technicians who will be servicing your account are well-versed in both the hardware and software.

■ How flexible is the "operator interface" to the equipment?

No system will operate efficiently if it is too difficult to understand. If possible, have a somewhat less technical staff member attempt to use the system. If you discover that the information you must supply and that which you receive is in "vendorese," find out what steps, if any, the vendor is taking to provide a translation into everyday English.

System flexibility and ease of operation should be given fairly high priority in your consideration of vendors. Simple English responses may not be enough if you have to go through numerous menus to get to

your host system for providing availability and management reports? Do you need the capability to control the multiplexer from your host system?

The issue of hands-off network man-

that you are considering, make sure the interface provides all the capabilities of interactive communications, operator notification of the action being taken and an audit trail of all activity. The interface should also be transparent to your system: The amount of software changes, additions and enhancements required to implement the interface should be minimal.

While it provides food for thought, this list of T-1 management questions is by no means complete. The questions are only intended to provide a foundation of information for assisting in the evaluation of a T-1 network.

Managers must move ahead carefully, asking questions and not stopping until they get answers they can understand and use. Doing otherwise could be a very large gamble, with managers betting their networks — and their jobs. □

D o you need the capability to control the multiplexer from your host system?

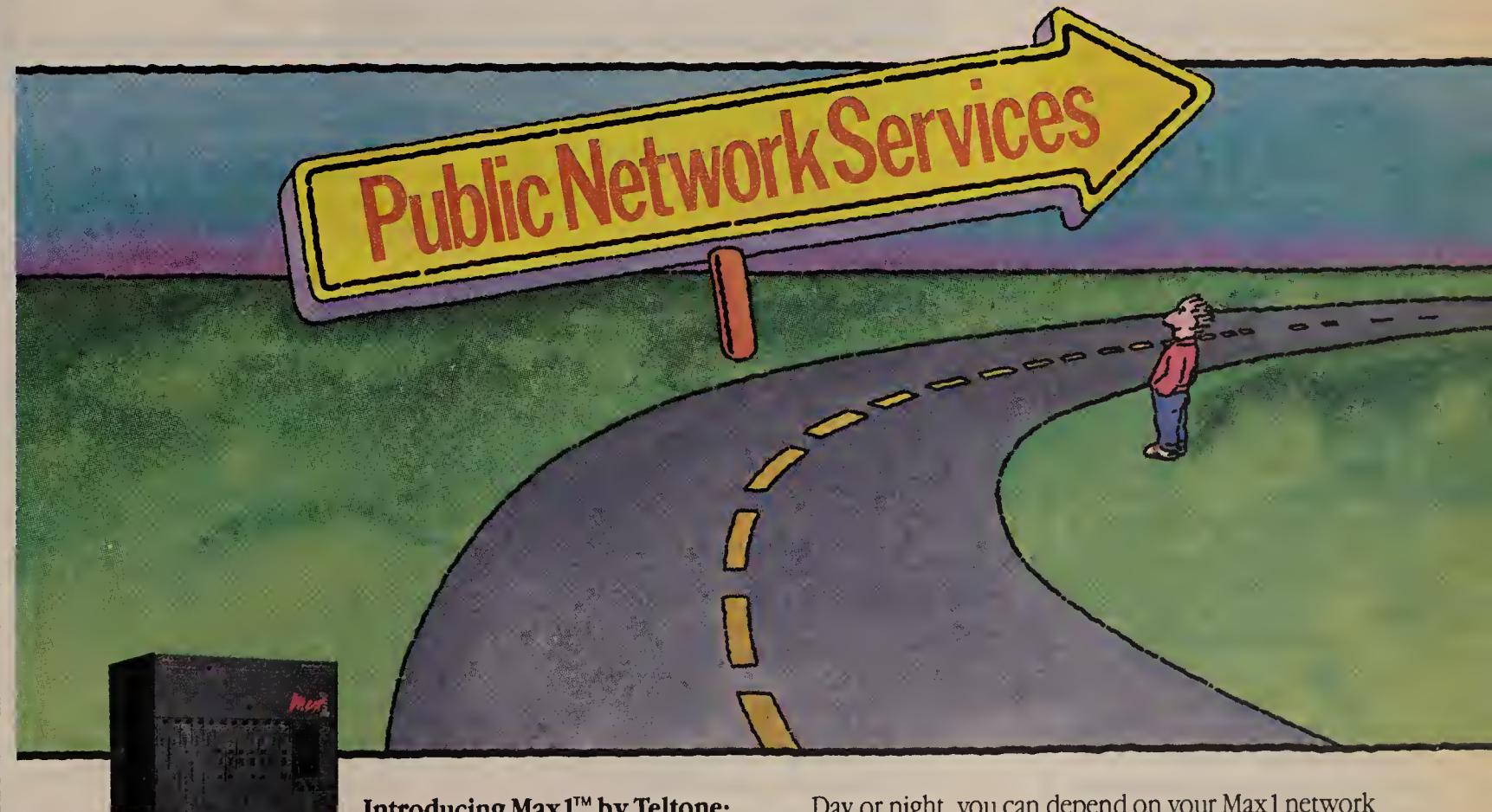


the information you want.

■ What capabilities, if any, exist to incorporate the information received from the multiplexer into

agement is one that is still being debated. Most T-1 vendors now provide some type of interface from their equipment to a mainframe. If the hands-off issue is one

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IBM extends NetView reach

continued from page 1

matrix switches from ByteX Corp.

Overall, the announcements continue IBM's efforts to flesh out NetView and extend its reach, analysts said. "It's sort of like completing a package. Things are getting tied down and tied together," said Frank Dzubeck, president of Communications Network Architects, Inc., a Washington, D.C. consultancy.

A number of industry observers and IBM customers had characterized the original NetView, released in May 1986, as a CPU resource hog that carried heavy staffing requirements. Release 2, which came out in June 1987, represented a "substantial performance improvement," according to Robert Anderson, IBM manager of telecommunications software product management for IBM's U.S. Marketing and Service Group.

Features in NetView Release 3 that will make it easier to automate some net management tasks are intended to "directly address the staff overhead issues," Anderson said.

Version 3 enhancements

To make it easier for users to automate NetView procedures, IBM added support for a high-level procedural language called Rexx, part of its Systems Application Architecture and previously available only in selected mainframe environments.

Rexx will make it easier for programmers to write NetView command lists, or CLISTS, which are collections of commands that perform certain functions, said Atul Kapoor, vice-president of Kaptronix, Inc., a consultancy in Haworth, N.J. If a host computer failed, a NetView CLIST could automatically order a second host to take over the first's network resources, he explained. The original NetView CLIST language was "crummy," he said.

To get users started, IBM announced the SolutionPac NetView (Automated Network Operations), a package of training services, customization and ready-made CLISTS for first-time NetView buyers, Anderson said.

NetView also now supports the C and PL/I languages. PL/I support lets users work with IBM's KnowledgeTool, an expert-system development package. Adding expert-system techniques to net management will pave the way for automating complex jobs, such as quickly identifying complex problems in intricate networks, Anderson said.

The new release also offers a more "tightly knit" interface between NetView on mainframes and NetView on IBM's mid-range systems, such as the 9370 and AS/400, Anderson said.

In the past, mainframe-based NetView only received messages that alert conditions existed on mid-range systems. The operator had to log on to the smaller system to actually access the information about the alert. Now this information is passed directly to the host NetView, Anderson said.

Dzubeck singled out another newly announced feature, Network Asset Management, as an important and "long overdue" addition to NetView. He noted that network managers are controlling, among other things, physical assets, such as modems,

microcomputers and communications controllers.

NetView can now collect and store serial numbers and other information associated with specific devices. This information assists in automated inventory management, according to the IBM announcement.

NetView Release 3 for MVS/XA will be available in May 1989 at prices ranging from \$39,450 to \$81,600, with a monthly license charge of \$1,315. NetView Re-

lease 3 for VM will be available in August 1989, and prices will range from \$9,470 to \$48,890, with a monthly fee of \$987.

NetView/PC

NetView/PC, designed to bring non-Systems Network Architecture network management information under the host NetView umbrella, has been extended to run under IBM's OS/2 Extended Edition, the operating system for IBM Personal Sys-

tem/2s. The move is important to network equipment vendors, who have been clamoring for the power of OS/2 to improve their ability to interact with NetView, Anderson said.

The current PC-DOS NetView/PC environment imposes serious development constraints, observers agreed. The Personal System/2 offers a more powerful processor, a huge increase in memory (from 640K bytes to 16M bytes) and multitasking op-

FROM THE OUTSIDE LOOKING IN.

Edward Edelson—on ISDN

Mr. Edelson is an award-winning science writer who has written a number of magazine articles and more than a dozen books on subjects ranging from the search for life on other planets to neurochemistry.

Like anyone who reads the news, I can see that the ISDN revolution is beginning. The names of the manufacturers in ISDN technology are among the biggest in the field, and the resources they're deploying show an irreversible commitment to making ISDN a reality. The names of the users start with McDonald's, which speaks for itself. When McISDN went into operation, any doubts about the transition of ISDN from an experimental technology to a paying business were invalidated. You've got to be pretty hardcore now to doubt that ISDN is here to stay.

My advantage here is that I'm looking at ISDN with new eyes—as an outsider looking in. And as I educated myself by reading through the mountains of material written about ISDN, I felt a quick pulse of sympathy for the people like you who have MIS and telecommunications decisions to make. You're being given a lot of talk about future prospects. But you know you're not being paid to let your imagination run wild about distant possibilities and blue-sky promises. The real question for you is: What do I do about ISDN today?

My belief is that you've got to think about it and start implementing it—and that the best way to do that is to think small.

If you don't think about ISDN, if you wave off the decision for now, your boss won't notice, not right away. But if you don't start factoring ISDN into everyday decisions in a way that will move you down an evolutionary pathway toward this new technology, you'll regret it a few years from now—when you groan about the couple of hundred dollars it costs to move a telephone from one end of the office to the other, or when you're agonizing about making the wholesale changeover that's necessary to play catch-up with your competitors.

Because I cover science and technology, I know we're in a new information era. I'm reminded of that every time I sit down at a terminal in the city room or get my computerized paycheck. And I know enough about the complexity of our new electronics to be aware that this new era requires coordination of departments, individual workstations like mine and, for big corporations, databases. I also know that galloping technology makes for shorter decision periods in a global context.

If your job is to keep up with that technology, to make decisions about internal communications, local area networking, metropolitan area networking, wide-area networking and the like, you're being blind to the future if you don't factor ISDN into the decisions you make today. About equipment. About repair and installation costs. About growth and expansion.

Without looking too foolish or getting an advanced degree in electronics, things got a lot clearer when I looked at the ISDN bottom line: How's it going to help me and what's the first step to take?

The second part of the question is kind of easy. ISDN will give you megabit-per-second-transmission rates that will allow you to talk about data as you send it. It will give you graphics capabilities of unprecedented clarity and detail. It will just about eliminate transmission reliability problems. You'll be able to plug anything from a telephone to a minicomputer into one common jack, just as you please.

The first part is tougher.

You might hesitate about ISDN because you think of a pioneer as the guy with the arrows in his chest. But kick around the repercussions of locking yourself into today's technology versus leaving the door open for ISDN's advantages—with an eye toward the future that, it seems to me, is already here.

eration, they said.

Anderson said these network vendors can now write more sophisticated net management applications that will use NetView/PC to pass information back to the NetView host. With OS/2 multitasking, these applications will be able to handle a number of functions simultaneously.

Users may also soon begin to see third-party applications that utilize better NetView/PC's Service Point Control Facility

(SPCF), which has been enhanced in the new release.

SPCF enables an operator working with host NetView to issue commands that will control non-IBM equipment on the network, explained Kaptronix's Kapoor. This capability has always been present, he said, but the new release "made it easier to implement."

This week, at the Tele-Communications Association, Inc. show in San Diego, IBM will un-

veil several newly enhanced programs from third-party developers that exploit the new NetView/PC release.

Scheduled to be available next May, NetView/PC Version 1.2 is priced at \$3,000.

Netview DM

Easier software distribution is the goal of Release 2 of NetView Distribution Manager (DM). It has been extended to support the central, automatic distribution

and installation of IBM 3174 terminal controller microcode, said Anderson. "Customers don't have to run all over the country with floppies. They can now do changes centrally with the Distribution Manager," he said.

NetView DM also now supports communications among DM hosts. Previously, a DM host could update files only on connected nodes, Anderson said. Now a DM host at corporate headquarters can run the same update

procedure for nodes controlled by other DM hosts, he said.

NetView DM for MVS/SP, available in June 1989, is priced from \$36,270 to \$124,850, with a monthly license charge of \$2,015. For VM/SP, available in December 1989, the price range is from \$13,590 to \$93,620, with a monthly charge of \$1,510.

IBM also extended these so-called "change management capabilities" by announcing the IBM PC Node Executive, a software program that runs on IBM Personal Computer ATs and XTs and Personal System/2s.

This program works with another application, VTAM Protocol Conversion Application, to allow users to distribute software from an IBM System/370 under MVS/XA or MVS/ESA directly to a Personal Computer workstation, according to the announcement.

This provides a means of automatically updating Personal Computer software and applications for Personal Computer users on a network.

PC Node Executive is priced at \$145 and will be available in March 1989.

NET control

In the area of transport network management, IBM announced the Transmission Network Manager (TNM). The TNM is an IBM Personal System/2 Model 80 that incorporates software needed to manage NET's Integrated Digital Network Exchange (IDNX) T-1 multiplexers, creating what Anderson described as a graphics-oriented, mouse-driven workstation.

As analysts pointed out, the TNM substitutes the Personal System/2 for the Sun Microsystems, Inc. workstation that NET sells as part of its own management offerings. But the new product also integrates NetView/PC — so IDNX management data can be passed to a NetView host — and incorporates all the functionality of existing NET management products, officials at IBM and NET said.

The TNM represents the first product resulting from the marketing and product development agreement announced by the two companies in June 1987. IBM will use a stepped, cumulative price scheme for the TNM, based on the number of network nodes supported: Up to four nodes cost \$34,000; for five to eight nodes, IBM charges an additional \$25,000, and so on. The TNM will be available in June 1989.

IBM also released a new version of a NetView application program called IBM Matrix Switch Host Facility 2, which centrally manages the IBM 3728 matrix switch and the Bytex Autoswitch 1000 and 4000 matrix switches. Bytex supplies the 3728 to IBM. The new release extends this support to the VM operating system and lets the 3728 and the larger switches work together.

Available Oct. 28, Matrix Switch Host Facility 2 is priced at \$12,600. □

DEC set to release specifications

continued from page 8

el, ISO's Office Document Architecture/Office Document Interchange Format, the Standard Generalized Markup Language and Adobe Systems, Inc.'s PostScript page-description language.

This dedication to open standards will protect customers' investments in the technology, Woolf said. "A good architecture can adapt over time to gracefully embrace new technology and changing customer needs," he said.

DEC expects one emerging user need will be for documents that contain video. According to Woolf, work has already begun on expanding CDA to include this element.

Documentation detailing how to develop-

op CDA-compatible software will initially be supplied only to application developers that are signed up to receive pre-release versions of DECwindows software and to developers DEC has been working with over the last 18 to 24 months as early implementors of CDA, Woolf said. Eventually, the documentation will be shipped as standard features of Ultrix and VMS, although he declined to say when.

A key component of CDA, Woolf said, is its Digital Document Interchange Format (DDIF), which provides a standard format for storing and interchanging networked, compound documents. "[DDIF] defines the structure, the content, the attributes and the layout of a revisable compound document," he said.

For application developers, the key will be developing software that converts applications from current formats into DDIF

and back again. DEC will provide documentation to developers, which Woolf said will simplify this process.

Industry analysts hailed the new architecture as a solid step toward systems integration. "We have to face the fact that computing platforms are becoming diverse and there has to be a way to unify and tie them together," said Hait Kapoor, senior vice-president with the Norwell, Mass., consulting firm CAP International, Inc. "I think a document architecture is certainly one of the beginnings."

Kapoor said he expects to see some products announced within six months that support CDA, although the full effect of the architecture may not be felt for two to three years. He said Apple will likely produce some of the first applications to support CDA because of its long-standing relationship with DEC. □

Unisys OS boosts net capabilities

continued from page 4

Unisys' OSI Message Handling System (OSI-MHS) software supports the X.400 standard, enabling Unisys 1100 and 2200 systems to exchange electronic mail with other systems running X.400-compatible software. Unisys' OSI File Transfer, Access and Management (OSI-FTAM) software enables Unisys 1100 and 2200 systems to transfer files with other vendors' equipment running FTAM.

Also released last week was Unisys' SNARJE software, which enables Unisys 1100 and 2200 mainframes to appear as remote job entry workstations to an IBM Systems Network Architecture-attached mainframe running JES2. This enables Unisys systems to submit batch files to an IBM mainframe for processing.

Finally, Unisys released software that enables its Unix-based minicomputers and any MS-DOS-based microcomputer to access 1100- or 2200-resident data.

Online Decision Support (ODS) software runs on Unisys' Unix-based U 5000 and U 7000 minicomputers. ODS consists of two modules, an ODS/Host module running on the mainframe and either an ODS/5000 or an ODS/7000 module running on the minicomputer. With the package, the U 5000 and U 7000 users can copy data from 1100 or 2200 mainframes as well as upload data to those mainframes.

Unisys' Online Extract/Data Management System (DMS) software runs on both the mainframe and IBM Personal Computers. It enables users to extract 1100 or 2200 mainframe data and convert it for use in microcomputer applications.

SB3 and the new application software will be available in November and will ship on all new 2200/600 mainframes. OS 1100 license holders can upgrade to SB3 at no charge, but users must purchase the new applications that run under SB3.

Depending upon the mainframe model, OSI-MHS costs \$23,140 to \$61,705, while OSI-FTAM costs \$11,045 to \$29,450 and SNARJE costs \$6,310 to \$13,465. ODS mainframe modules cost \$8,000 to \$17,600, while the minicomputer module costs \$1,000 to \$3,000. Online Extract/DMS costs \$8,800 to \$19,360 and includes the Personal Computer software. □

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Memotec cuts top staff at Infinet unit

continued from page 4

communications area," said Larry Cynar, an analyst with Dataquest, Inc. in San Jose, Calif. "The jury has been very lenient in a lot of cases. I think it's overdue."

Analysts estimate Infinet had revenue of about \$40 million last year, but Nehme, speaking from Montreal, would not release financial information and he could not confirm whether Infinet has been profitable. He said he was unable to obtain revenue and profit figures from Infinet's finance department.

Memotec, he said, is an \$850 million company with a corporate strategy of acquiring companies to broaden its product line. It acquired Infinet in 1986 to add its line of modems, statistical multiplexers and network management systems to its own product line, which includes X.25 and data compression equipment.

Memotec also owns Teleglobe Canada, Inc., Canada's sole provider of overseas telecommunications services. That firm accounts for a large portion of Memotec's revenue. □

Big Blue offers OSI, TCP/IP tools

continued from page 1

products will be supported as part of its Systems Application Architecture (SAA).

The announcements put some teeth into statements by IBM executives that the company is committed to OSI, industry analysts said. "This was a significant volley for IBM. These are fairly robust product offerings," said Mark Leary, director of Communications Research Programs at International Data Corp. (IDC), a Framingham, Mass.-based market research firm.

OSI products

IBM is repackaging several of the OSI products it introduced in Europe last fall as one offering for the U.S., said IBM's Donald Holtz, OSI and distribution products manager at Research Triangle Park, N.C.

The package, called the IBM Open Systems Message Exchange (OSME), allows an IBM System/370 running VM/SP, MVS/SP or MVS/XA to exchange X.400-based messages with other processors running the OSI protocols.

OSME supports OSI protocols from the network through presentation layers — OSI Layers 3 through 6 — as well as X.400.

IBM is also offering the X.400 PROFS Connection and the X.400 DISOSS Connection, which allow Professional Office System users and DISOSS users, respectively, to send X.400 messages to other X.400 users. These products are also offered in Europe.

OSME for VM is priced at \$43,000, while OSME for MVS costs \$74,000. The X.400 PROFS Connection is priced at \$13,000, and the X.400 DISOSS Connection costs \$15,800. All four products will be available in December.

IBM also announced the OSI/Communications Subsystem (OSI/CS), which is the OSI implementation IBM will move to over time, Holtz said. When OSI/CS is delivered in March 1990, it will replace the implementation of OSI Layers 3 through 6 currently used in OSME, Holtz said.

According to Holtz, IBM's European OSI products conform to an OSI implementation agreement adopted by European computer makers, rather than the implementation adopted by the National Institute of Standards and Technology, formerly the National Bureau of Standards.

To remedy this, OSI/CS is being designed to conform to the North American, European and Japanese OSI implementations, Holtz said.

OSI/CS will be available for MVS/XA, MVS/ESA and VM/SP in the first quarter of 1990. It will allow hosts to communicate with IBM and non-IBM systems running similar OSI protocols.

IBM also announced OSI/File Services, the first OSI application to work with OSI/CS. OSI/File Services supports file transfer and management using OSI File Transfer, Access and Management protocols. Both the VM and MVS versions will be available in mid-1990.

In addition to supporting OSI applications, OSI/CS will support links to NetView. This will allow users to manage both SNA and OSI networks with NetView.

OSI/CS uses the transport and data link control functions provided by VTAM/NCP, which help in the detection and forwarding of network management information to NetView and allow sharing of adapters and connections by SNA and OSI devices.

OSI/CS will also include an application programming interface that will allow us-

ers to write applications that utilize OSI protocols.

OSI/CS will also be included in IBM's SAA. IBM currently supports 13 other protocols as part of SAA, including X.25, the Token-Ring local network protocols, and Synchronous Data Link Control.

"By adding OSI into SAA, we're telling our customers that the distributed applications you run within the SAA environment will also be serviced by OSI protocols," Holtz said.

As a result, users will be able to write an application for a System/370 and have a part of that application execute on either another System/370 or an OSI-based system.

"What we're trying to do is add OSI into the SNA facilities we've taken great pains to implement over the years," Holtz said. "We want to add OSI in such a way that it minimizes the differences in terms of network management, applications and support. Customers want to manage the OSI and SNA portions of their network with the same facilities."

Onetime charges for OSI/CS on MVS systems range from \$76,320 to \$116,100, and monthly license charges range from \$1,590 to \$2,150. The MVS version is slated for delivery in March 1990.

Onetime charges for VM systems range from \$9,510 to \$109,350, and monthly license charges range from \$317 to \$2,025. This version is scheduled to ship in June 1990.

OSI and TCP/IP product introductions also indicate IBM is bowing to customer pressure for products that allow IBM systems to play in a multivendor network. "IBM has succumbed to the ultimate pressure — user demand," noted Stefano Robotti, senior market analyst for Network Architectures and Standards at IDC.

TCP/IP

"The TCP/IP-on-MVS announcement is a clear move to open systems now. People are using TCP/IP and MVS now, whereas the OSI stuff is a little bit off in the future," Robotti said.

IBM had previously offered TCP/IP for its VM, PC-DOS and AIX operating systems. IBM TCP/IP for MVS Release 1.0 allows a mainframe running MVS/370, MVS/XA or MVS/ESA to communicate with other systems running TCP/IP protocols. It supports TCP/IP's File Transfer Protocol, the Simple Mail Transfer Protocol for messaging and Telnet for logging on to a remote host.

Release 1.0 also supports Sun Microsystems, Inc.'s Network File System (NFS) and Remote Procedure Call (RPC). NFS, priced separately, allows an MVS system to act as a file server to other systems running NFS client software. RPC allows applications to initiate procedures on remote machines while making it appear as if these procedures were being executed locally.

Onetime charges for TCP/IP for MVS range from \$30,240 to \$46,060, and monthly license fees range from \$630 to \$855. It will be available in June 1989. IBM also unwrapped the 8232 LAN Channel Station, which links an IBM System/370 to an Ethernet local network running TCP/IP or the Manufacturing Automation Protocol.

The 8232 is based on an IBM Industrial Computer and provides attachments from mainframes to the IBM Token-Ring Network, IBM PC Network or Ethernet. It can be used to link a MAP Version 2.1 network with a System/370. The 8232 comes in two models, priced at \$16,725 and \$20,450. □

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FCC ruling on Tariff 15 fuels furor

continued from page 1

by-case basis, it will effectively be deregulated, they said.

AT&T contends that it must be allowed to respond if competing carriers are permitted to offer customer-specific discounts. The company said the first Tariff 15 pricing plan it proposed — for Holiday Corp. — is a direct response to an off-tariff offering from MCI.

In an order issued late in the day on Sept. 16, the FCC said it will investigate whether a different set of rules should apply to dominant carriers such as AT&T and nondominant carriers such as MCI and US Sprint Communications Co. AT&T has not yet officially extended its Tariff 15 pricing

cal to us to have the freedom to respond to the competitive marketplace."

John Hoffman, senior vice-president of external affairs at US Sprint, said that because AT&T is still a dominant carrier, it is appropriate to have rules guarding against anticompetitive behavior for AT&T that don't apply to smaller carriers. AT&T is powerful enough to drive competitors out of business by continually underpricing services, he said. "Even if we gave service away for free to make inroads against AT&T, we'd run ourselves out of business before we made a dent," Hoffman said.

The decision allowing Tariff 15 to go into effect was supported by FCC Chairman Dennis Patrick and Commissioner James Quello. However, Commissioner Patricia Diaz-Dennis issued a dissenting statement supporting suspension of the tariff during the FCC's investigation.

"Based on the evidence before us, there is a strong likelihood that the commission is allowing a discriminatory and unlawful tariff to take effect," Dennis said.

Some of the top staff members in the Common Carrier Bureau, which generally handles tariff decisions, apparently also objected to the tariff. In a 17-page memo circulated by Deputy Bureau Chief Carl Lawson and obtained by *Network World* last month, commissioners were urged to reject Tariff 15.

"Any rate that [carriers] may charge on a single-customer basis would be unlawful under Section 202 [of the Communications Act]," the memo concluded. According to this rule, if MCI's offer was targeted exclusively to Holiday, it would be unlawful and AT&T would not be allowed to meet such an offer with one of its own.

This legal analysis would seem to indicate that the FCC may ultimately reject Tariff 15. But the commission said that, to date, there is no "clear demonstration of unlawfulness which would warrant rejection." The order did say, however, that the lawfulness of MCI's offer to Holiday Corp. and of similar customer-specific arrangements would have to be considered in order to determine Tariff 15's legality. □

"We're waiting for the best price," Holiday said.

▲▲▲

offer to Holiday, but that will probably occur soon, according to Michael Murphy, division manager for AT&T business services. A Holiday spokeswoman said her company is waiting to see what AT&T offers before making a decision. "We're waiting to see what the best price is," she said.

But MCI wasn't waiting to express its views. Gerald Kovach, senior vice-president of regulatory and public policy at MCI, said the FCC's decision "makes a sham of the [Communications Act of 1934] and of its own regulations."

This decision, combined with the FCC's decision to allow AT&T to proceed with several custom-designed network offerings under Tariff 12 while the agency investigates the contracts, sends a signal that the commissioners "are just turning their backs on the industry," Kovach said.

Murphy said AT&T was "gratified" by the FCC decision, adding that Tariff 15 "puts AT&T back in the ballpark. It's criti-

A shopping guide to LAN power supplies

continued from page 27

UPS' effectiveness.

An off-line UPS is the simplest form of power backup. The term UPS, in this case, is a misnomer because the inverter in these units is normally off. For this reason, off-line UPSs are also known as standby power sources (SPS). Theoretically, an SPS is designed to switch onto its battery before the computer senses a power loss. During this switch-over, a momentary loss of power occurs, typically lasting five to 20 milliseconds.

SPS inexpensive

In many situations, an SPS can be an inexpensive solution to blackouts. But an SPS typically provides no line conditioning

or voltage regulation and only limited surge and spike protection. During brownouts, an SPS can inaccurately sense a blackout and prematurely switch onto battery power.

In the real world, brownouts often precede blackouts. This low-voltage condition can cause an SPS' switching time to more than triple, thereby placing a system at even greater risk.

Hybrid UPSs are inherently off-line units with a line conditioner, but they are almost always misrepresented as on-line UPSs.

Hybrids attempt to eliminate the switching glitch by using the capacitance of their electronic or ferroresonant conditioner to bleed power onto the load line while the unit switches onto its battery. In reality, this concept does not always work. Like an SPS, hybrids cannot provide com-

plete protection against many power problems, including brownouts.

On-line UPSs are the only truly uninterruptible form of power supplies. Since they operate on their inverters continuously, no switching takes place. As a result, they are not subject to the previously mentioned problems and provide the highest level of protection.

Two other important issues to consider when selecting a UPS are output waveform and nonlinear load capability.

Various input and output waveforms are available. UPS units are available in sine wave, quasi-sine wave and square wave outputs. Sine wave is best because other waveforms only approximate the utility sine wave and can cause various elements of a system to overheat and fail prematurely.

Today's computers use switch-mode

power supplies that draw power in the form of nonlinear, repetitive peak current. A UPS must effectively support these nonlinear loads both before and during an outage.

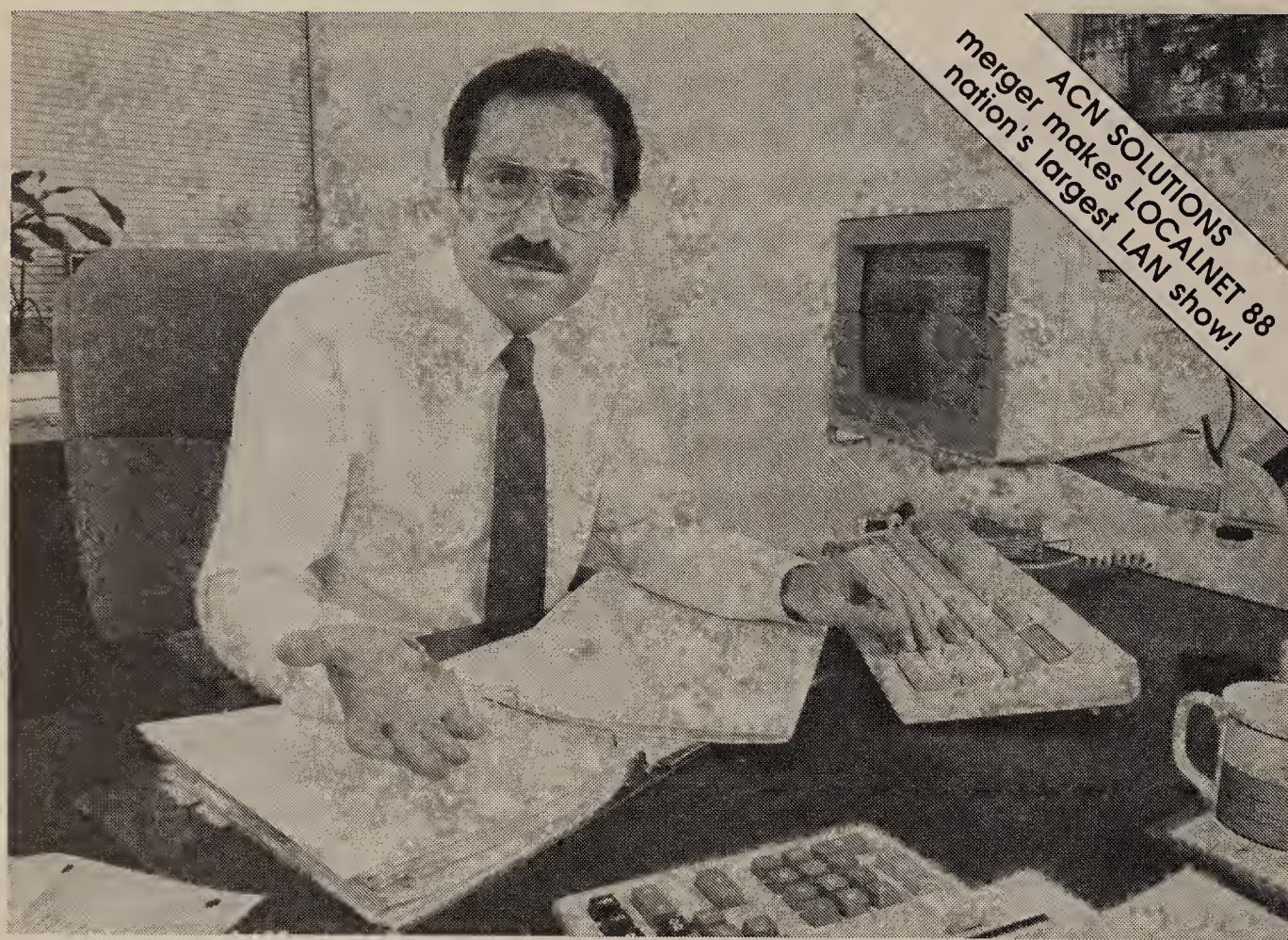
Unfortunately, many UPSs are simply repackaged versions of 10- or 20-year-old technologies masquerading as the latest breakthrough.

Today's state-of-the-art UPS is an on-line, sine wave system that supports both linear and nonlinear loads. Modern UPSs are smaller than most SPSs and are currently available at dramatically reduced prices, giving the budget-conscious consumer a choice never before offered.

The following questions should be considered before choosing a UPS:

- Is it off-line (fair), hybrid (average) or on-line (best)?
- Does the inverter power 100% of the load continuously? (If yes, it's on-line. If no, it's off-line or hybrid.)
- Is the output square wave (not recommended), quasi-sine wave (fair) or sine wave (best)?
- What is the lowest input voltage it can accept without discharging the battery? (The lower, the better.)
- What is the repetitive peak current capability at 100% nonlinear load while maintaining less than 5% total harmonic distortion? (The higher, the better.)
- Can the backup time be extended? (The longer, the better.)
- Is it listed by the Underwriters Laboratories, Inc.? Does it meet FCC 15J and pass IEEE 587 requirements?

Armed with this basic knowledge of UPSs and some good common sense, you can be assured of choosing the highest quality power protection available. □



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Image-processing system, net unite

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the very large files associated with image processing systems, according to Stephen Monro, marketing manager at International Datacasting. "Trying to move these image files over existing [land lines] is far too slow for high-volume applications," he said.

The new system, by comparison, preserves the high throughput of FileNet's Ethernet architecture in a wide-area network, he said.

The ability to distribute data to numerous locations simultaneously is another problem that satellite networks can solve more cost-effectively than point-to-multipoint T-1 lines over long distances, Monro added.

To illustrate the cost-effectiveness of the combined systems, the companies cited the example of sending four 8½-by-11-in. pages of text and images — about 750K bytes — between Los Angeles and San Francisco.

A leased T-1 link could transmit the documents in less than a second, but the monthly cost of maintaining the link between those two points could be as much as \$10,000, according to FileNet and International Datacasting.

In contrast, satellite access for high-speed transmission ranges between \$8,000 and \$10,000 a month but offers the ability to transmit documents to an unlimited number of locations nationwide, officials said.

The companies plan to extend their marketing agreement in the future by enabling the FileNet WorkFlo software to operate over International Datacasting's satellite network. □

New modems, DSU/CSU lead IBM data networking introductions

Firm also offers ISDN interface, ACF and Series/1 upgrades.

By Paul Desmond
Staff Writer

NEW YORK — IBM last week announced a series of modems and a multi-function interface for digital data services, both of which work with the company's NetView communications management products.

Other data communications products announced in the IBM product blitz last week were an ISDN adapter, a Token-Ring Network interface for IBM's Series/1, a programmable communications card for that minicomputer and an X.25 interface for IBM's Personal System/2.

Nine new stand-alone and six rack-mounted modems, all part of the IBM 7860 family of Network Management leased-line modems, were also announced.

The 7861 stand-alone modems come in one-, two- and four-port models. The multiport models support a multiplexing feature that is new with the 7860 modems.

That feature allows asynchronous or synchronous data transfer over the same link while permitting different terminals to transmit at varying speeds.

Transmission speeds

The four-port modems have maximum speeds of either 9.6K, 14.4K or 19.2K bit/sec, while the one- and two-port models support transmission speeds of either 4.8K, 9.6K or 14.4K bit/sec. The 7868 rack-mounted versions offer the same options but do not include a single-port model. All models are compatible with IBM's 5860 modem family and have EIA-232-D interfaces.

The modems can be operated from NetView, from an Application System/400 minicomputer or from each modem's keypad and display. When used in conjunction with NetView and Advanced Communications Function/Network Control Program software, each modem in the network can be configured, operated and tested from a single workstation.

Should a remote modem fail for any reason, including loss of power, the modem retains enough power to notify the control modem before becoming completely disabled. On a multipoint line, some modems can fall back to slower speeds while the others run at full speed. The control modem will accept data at alternate speeds.

The 7861 stand-alone and 7868 rack-mounted modems are available now. Prices range from \$1,600 for a stand-alone model with a maximum speed of 9.6K bit/sec to \$3,700 for the 19.2K bit/sec version.

DSU/CSU

Another product announced last week was the 5822 Model 18 DSU/CSU, a rack-mounted data service unit/channel service unit that can be used with point-to-point or multipoint digital data services. Alternatively, the device can be used as a limited-distance, point-to-point modem.

The 5822, which transmits at speeds from 2,400 to 56K bit/sec, supports EIA-232-D and CCITT V.35 interfaces. Automatic self-testing is triggered when problems are detected.

Scheduled for shipment next March, the 5822 costs \$1,810.

Line interface board versions of the

7860 modems and 5822 Model 18 were also unveiled for the IBM 3745 communications controller. Dubbed the LIC 5 and LIC 6, the cards contain two 14.4K bit/sec analog modems or one 56K bit/sec DSU/CSU. Both are available now. The LIC 5 costs \$4,700 and the LIC 6 is \$3,100.

IBM also introduced the 7820 ISDN Terminal Adapter, a product that was first announced for European distribution at the Hannover Fair CeBIT '88 trade show in West Germany last March ("IBM displays ISDN wares in Europe," NW, March 21).

The device is scheduled to be available in the U.S. in the second quarter of next year.

Series/1

The communications capabilities of IBM's Series/1 minicomputer were enhanced with the announcement of a Token-Ring interface and a new communications interface board.

The IBM Series/1 Attachment Card to the IBM Token-Ring Network is compatible with Series/1s using a 4956 processor. The board requires one slot in the minicomputer and is based on a Motorola Corp. 68000 processor, providing an intelligent interface between the Series/1 and the Token-Ring.

The other communications interface unveiled was the IBM Series/1 Multiline Communications Co-Processor, a user-programmable interface that has 64K bytes of read-only memory and 1M byte of dynamic random-access memory.

The product supports data transmission at 64Kbit/sec using CCITT V.35 interfaces and at 19.2Kbit/sec using V.24 interfaces. Synchronous, asynchronous and Synchronous Data Link Control/High-Level Data Link Control protocols are supported.

Availability is planned for next April at a cost of \$6,000. Adapters cost \$340 for the V.24 and \$360 for the V.35.

Personal System/2

Personal System/2 users will be able to access X.25 packet-switched networks using IBM's new X.25 Interface Co-Processor/2. A single-slot, full-length adapter, the product provides full-duplex synchronous or asynchronous communications through a single serial I/O port.

The board supports data speeds up to 19.2 bit/sec via an X.21bis V.24 link and speeds of 64K bit/sec with a V.35 connection.

The X.25 Interface Co-Processor/2 is scheduled for availability in December and costs \$1,195.

IBM also enhanced its Advanced Communications Function/VTAM (ACF/VTAM) software by dramatically increasing its addressing capabilities and doubling the number of network data paths it supports.

ACF/VTAM Version 3 Release 2 now supports subarea addressing for up to 65,000 nodes, up from the previous limit of 265 nodes. The new release increases the number of data paths the software provides from eight to 16 for greater network redundancy.

Availability varies from this December to next June depending on application, while prices vary from \$4,590 to \$10,710 depending on configuration. □

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MAP/TOP group details reorganization

continued from page 2

ees said they had purchased products ad-

vertised as MAP-compliant only to find that they complied only with parts of MAP.

In his keynote speech, Robert Metcalfe, distributed systems division general manager for 3Com Corp. in Santa Clara, Calif., said combining the efforts of COS and SPAG will benefit all parties.

"COS has spent more than \$10 million to develop [protocol sets], test tools and promote OSI by supporting events such as [ENE]," Metcalfe said. SPAG has spent \$5 million on the same projects, Metcalfe said. "Companies like IBM and DEC, which were members of both groups, began to notice that there was a great deal of duplication of effort." □

Under the new program, a firm that joins as a Corporate Managing Affiliate (CMA) is charged \$20,000 a year. CMAs elect the steering committee, manage project task groups, can attend exclusive business and policy meetings, and can participate in long-term planning.

The users group raised the cost of a Corporate Affiliate membership from \$1,000

a year to \$1,500 a year. The Corporate Affiliates elect a group chairman, who represents all corporate affiliates as a member

of the steering committee.

A Corporate Affiliate company can contribute to the users group's project task groups, participate in the development of the MAP/TOP specifications and attend exclusive technical meetings. New individual memberships cost \$150 a year.

Although users group officials claimed the new membership charges will not scare off users group members, one long-time member said pitching a \$20,000 CMA membership will be difficult.

"It'll be a hard sell," said William Geibel, network communications group director for Impell Corp., a Walnut Creek, Calif.-based engineering firm. "I'm really going to have to fight for this."

Impell, which currently pays \$1,000 a year for its Corporate Affiliate membership, "needs to be a Corporate Managing Affiliate so we can have a say in some of the users group's decisions," he added.

Geibel and other members applauded the recent decision of the Corporation for Open Systems (COS) and the European Standards Promotion and Applications Group (SPAG) to combine their conformance tests for the International Standards Organization's OSI standards (see "COS and SPAG join forces," page 6).

These tests will indicate if products comply with an OSI subset like MAP or with the entire OSI standard. Many attend-

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IBM offers multivendor network control and maintenance service

By John Cox
Senior Editor

NEW YORK — IBM last week launched a network monitoring, management and maintenance service that is an outgrowth of its acquisition last year of PacTel Spectrum Services from Pacific Telesis Group.

The Telecommunications Services, Network Support program includes a range of services, from simple maintenance contracts to full-fledged management of IBM and mixed-vendor networks from one of IBM's five Network Support Centers (NSC).

"We're taking ownership of the prob-

lems," said James Boyle, vice-president of telecommunications services for IBM's National Service Division. "We don't close it out until the customer agrees the problem is fixed."

Besides the basic troubleshooting service, under which IBM tracks down and fixes network faults even if they involve non-IBM equipment, the company will offer the remote monitoring and control services pioneered by PacTel Spectrum.

That service can entail placing remote diagnostic computers and network probes on the customer's network to monitor devices and functions, such as lines on a

3745 communications controller, Boyle said. IBM taps into the diagnostic computers and probes from its NSCs.

The IBM NSC facilities are in East Rutherford, N.J.; Walnut Creek, Calif.; Irvine, Calif.; Raleigh, N.C., and Atlanta. All will be connected by IBM's internal network, Boyle said.

Customers must have at least one IBM CPU running IBM communications software and have an IBM maintenance contract to be eligible for the service, which IBM offers under one- or three-year pacts.

The customer's network help desk acts as the on-site contact point for IBM's service. The desk's staff members become a central point for reporting network problems and will handle the simple ones. When they are unable to rectify the problem, they call an NSC.

The NSC staff works with the help desk

staff and, when needed, a designated representative at each customer site in the network. According to Boyle, a number of problems can be solved by phone.

More complex problems might require the use of a battery of remote diagnostic tools based at the NSC. If a modem begins streaming, causing an entire communications line to fail, the NSC could locate the faulty device and disconnect it remotely, explained Boyle. Then the NSC would make sure the appropriate service vendor was contacted to make the repair.

Where networks are composed of non-IBM equipment, NSC staff will work with the other vendors' service staff to coordinate the process of fixing the problem as quickly as possible, Boyle said.

Prices for the base service vary widely, depending on the equipment being covered, he said. During IBM's test-marketing, one customer with 1,000 workstations paid roughly \$6,000 per month. The cost of the optional probe equipment also varies widely. In market tests, customers paid from \$3,000 to \$13,000, depending on the network configuration. □

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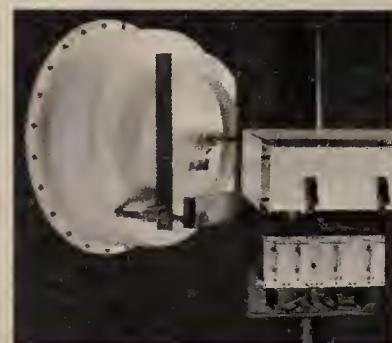
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COS, SPAG join forces in OSI test effort

continued from page 6

teroperable," said Graham Knight, sales and marketing manager at SPAG. "But the testing significantly reduces the likelihood that you won't be."

The Integrated Tool Set

SPAG and COS agreed to implement a common operating environment under which the Integrated Tool Set (ITS) will operate by the end of the first quarter of 1989. This phase of development is expected to cost about \$500,000.

The ITS is designed to operate on a Sun Microsystems, Inc. Sun 3 workstation running under Unix. The menu-driven system will generate tests on products to which it is connected by Ethernet or broadband cabling.

In its initial form, the ITS will include 11 existing tools — four from COS and seven from SPAG — to test different layers of the OSI model. The four COS tools deal with upper and lower level OSI standards for message handling; File Transfer, Access and Management; transport and internet. The SPAG tools cover mainly MAP and TOP protocols.

During a second phase, the groups plan to enhance the ITS with report generation, results analysis, documentation facilities and training services.

SPAG officials denied that the accord was tantamount to a merger of the industry groups, which have been examining how to coordinate their activities since November 1987. "Each organization will remain independent," Knight said. "There is no intention to have a formal merger at this stage."

SPAG was formed in 1983, three years ahead of COS.

SPAG officials confirmed that they are participating in discussions with the Promoting Conference for OSI, the Japanese equivalent to COS and SPAG, concerning a similar agreement. "Now we're in a position to go to the Japanese and see whether there are any common areas of interest where we can work together," Knight said. □

Based on reports from Anita Taff, senior Washington correspondent, and Amiel Kornel, IDG International News Service.

IBM introduces new version of Redwood PBX

By Rex Bowman
West Coast Correspondent

NEW YORK — Among the slew of data-related announcements IBM made last week, the company released a new version of its Redwood private branch exchange and a way to extend control of that switch to the company's AS/400 minicomputer.

IBM also introduced a voice-response system and a new Rolmphone.

The IBM 9722 Redwood Release 3 is an enhanced version of Release 2.1. Like the previous release, the new Redwood system can function as a PBX, key or hybrid system and can support from 16 to 144 lines.

New with this release is support for analog telephones — one interface card can support as many as eight phones — and interfaces to voice-processing systems such as IBM's PhoneMail. The switch also supports the newly announced IBM 9270 Voice Response Unit.

Perhaps most significant, however, is the Redwood System Management Link, an RS-232-C link to the AS/400, and the accompanying IBM AS/400 Telephony Application Services Programming software that runs on the AS/400 under the IBM Operating System/400.

The system management link enables call detail records, alarms and administrative commands to flow between the switch and the minicomputer. The Applications Services program gathers Redwood calling data, which can be entered into "tracking and costing applications," IBM said.

The Applications Services program also enables users to configure Redwood from a terminal supported by the AS/400 or networked from a remote site to the AS/400. Configuration data for the Redwood can be stored on the minicomputer and downloaded when needed.

Redwood alarms can also be transferred to an AS/400 over the switch link. The alarms can be converted on the AS/400 and sent to an operator's message queue, or alerts can be passed on to a central NetView mainframe.

AS/400 applications will be able to use the switch link to initiate calls using new Telephony Connection Servers in conjunction with a new computer-assisted dialing application programming interface.

IBM also announced the IBM 9270 Voice Response Unit, a device that lets callers use their push-button telephones as terminals to retrieve from hosts information that is "read" back to them. In essence, the 3174 terminal controller-attached 9270 makes the host think the remote telephones are IBM 3270-type or IBM 5250-type displays.

Responding to voice prompts, callers request information by pressing certain buttons on their phone. The system converts requested data to an audio signal by stringing together prerecorded numbers or words.

The 9270, which can handle four simultaneous telephone calls, can initiate calls to numbers provided by the host.

IBM also introduced an enhancement of the Rolmphone 244PC, a digital Rolm telephone outfitted with an RS-232-C data communications interface supporting the Hayes Microcomputer Products, Inc. AT command set.

The telephone has been enhanced to

provide faster data call setup and the ability to program as many as 18 repertory dialing keys from the telephone keypad. These keys allow users to do one-touch call forwarding, set up conference calls and automate other frequently used features. Previously, customers had to program the keys using a utility on a personal computer attached to the phone's RS-232 port.

The new 244PC also supports application-definable keys, allowing application developers to define a hot key on the 244PC through the personal computer's application programming interface. A hot key lets the user switch from one application to another by pressing only one key.

The 9722 Redwood Release 3 is scheduled for release in December. Prices have not been released.

The AS/400 Telephony Applications Services program carries a one-time charge ranging from \$800 to \$4,800, depending on the AS/400 model type. It is scheduled for April release.

The IBM 9270 Voice Response Unit costs \$26,500. The model designed for 3270 environments is scheduled to be available in December. The model designed for 5250 environments is scheduled to be available in September 1989.

The enhanced Rolmphone 244PC is available now for \$624. □

OSI leaves room for proprietary nets

continued from page 1

that are "all things to all people," the standards bodies have allowed for a range of options at each layer of the OSI model. In so doing, they've perpetuated the interoperability problem, Calkins said.

Despite these shortcomings, user demand for OSI-based products is rising, vendors agreed. "OSI is affecting users' planning decisions," said Bernard Guidon, Network Systems Group marketing manager at Hewlett-Packard Co. Users aren't going to buy from a supplier that isn't committed to OSI, except perhaps IBM, he said.

This attitude is somewhat naive, vendors maintain. Users need to understand what OSI will and won't buy them. Where OSI really shines today is in its implementation in the Manufacturing Automation Protocol, Guidon said. The Manufacturing Messaging System within MAP, for example, provides communications between process controllers, numeric control machines and other factory devices.

"The MAP set of services are better than the ones you can find from proprietary computer suppliers," he maintained.

However, in the office environment, such OSI applications as File Transfer, Access and Management (FTAM) and X.400 cannot really compete with more feature-rich proprietary file-transfer and messaging applications, Guidon said.

When it comes to sending files or messages from one vendor's equipment to another's, the OSI applications are "good enough," Guidon said.

FTAM and X.400 messaging are all that OSI will offer for the next several years, according to Douglas McLean, network services product marketing manager at Apple Computer, Inc.

"If users want to implement a transaction-processing solution or if they need to do network management, OSI is not going to offer that for the foreseeable future," McLean cautioned.

Although the intention is to make OSI a full-function network, "it's going to take the industry quite some time to get there because the standards process is Byzantine," McLean added.

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objects on the network — including computers, disk drives and files — to be addressed. A related service tracks information about individuals on the network.

X.500, by contrast, handles addresses for individual users only. X.500 does not currently allow for private directories, but DEC's directory services do, Cannon said.

One area that OSI does not really address today is personal computer networking, said several vendors in this segment of the market. File- and print-sharing functions, for example, do not exist in OSI, noted Douglas Tsui, a strategic marketing manager for 3Com Corp.

"I don't think users understand the dilemma they have," said Paul DePond, director of product marketing for systems software at Ungermann-Bass, Inc., pointing to the fact that personal computers represent the largest number of devices on most networks today.

Because they're in a homogeneous environment, all local network users really need is a local network operating system for basic services, DePond said. If a local net user needs access to a host computer or public network, for instance, the appropriate OSI services can be supported on a local net server, he said.

Whether a personal computer is outfitted with a full seven-layer OSI protocol stack will depend on performance demands, 3Com's Tsui said. In some cases, users will want the computer to run the full OSI protocol stack and talk directly to a host. Intelligent network interface cards that do on-board protocol processing will make this scenario feasible, he added.

The bottom line, vendors agreed, is that users will move to OSI when the need for interoperability outweighs the benefits of a vendor's proprietary products.

Although OSI's functionality will increase as more pieces are defined, vendors will always maintain proprietary offerings, Apple's McLean said. Vendor-proprietary architectures will continue to evolve and improve at the same time the OSI protocols are being developed.

As a result, the standards bodies will have to "backfill" the standards with functions that "get invented in the proprietary architectures," McLean said. □

Users await new era of global nets

continued from page 1
across the world."

This push to deregulation was described as a victory for users.

"Users have gotten a taste of what the world can be like, and they aren't going to let it go," said Max Kunz, a director with the Swiss Telecommunications Users Group.

Deregulation is important because regulatory restrictions limit the networks users can build. European countries tend to charge high tariffs for international services. Also, nationalized telephone companies limit the kinds of equipment attached to the network.

This makes it difficult, for example, for a company to use the same kind of equip-

ment on both ends of a net.

But that is likely to change, said Bryan Carsberg, director general of the UK's Office of Telecommunications. "Competition does wonderful things for improving a carrier's performance," Carsberg said.

In preparation for the arrival of the Common Market of 1992, Common Market countries prepared in 1987 an internal report, called the Green Paper, outlining an architecture under which Europe's post, telegraph and telephone administrations would offer more consistent and flexible networking services.

The report said European countries should loosen restrictions on customer premises equipment and third-party value-added networks. It also said countries should take steps to make it easier to build Pan-European networks because those networks will become a vital link holding

together the Common Market.

Jorgen Richter, an official of the Telecommunications Directorate of the Commission of the European Communities (CEC), said a general assembly of the CEC voted last month to officially endorse the Green Paper.

In addition to discussing deregulation, speakers said that a boom in undersea fiber capacity promises to cut the cost and increase the size of international networks.

"I think we will have capacity coming out of our ears," said Robert Bennis, ICA's director of telecommunications public policy. "We'll see a day when a user with only a single 64K [bit/sec] link to Europe is archaic. Multiple T-1 lines will be the backbones of these international nets beginning next year."

Bennis' enthusiasm was spurred by the massive investment carriers worldwide are

making in undersea fiber cable. The first such cable ever laid, TAT8, is due to begin operations later this year, carrying traffic from North America to the UK and France.

TAT8 is scheduled to be followed shortly by cables to be laid beneath the Atlantic and the Pacific. According to Robert Boone, regional managing director for the Brussels, Belgium, subsidiary of AT&T, AT&T S.A./N.V., a total of seven major undersea fiber cables will be in place by 1995.

They will link most of the world's population centers in what Boone calls a "worldwide intelligent network." He argued that the availability of this capacity will spur users to wider use of transoceanic networks. "Some people say there will be a glut of capacity," Boone said. "But I know users will find a way to use it."

The availability of fiber as an alternative to satellites for high-capacity international networks could solve problems users currently face.

Many users, such as William Coopman Jr., manager of telecommunications for Deere and Co. and 1987-88 ICA president, said some applications cannot be supported by satellites. "The propagation delay on satellites is 500 to 600 milliseconds," he said. "Given that, I can't run the shared engineering applications I want." □

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Opponents decry Tariff 12 net

continued from page 2

to large customers while denying smaller customers the same benefits for the same services.

"Although AT&T uses the terminology 'custom-designed' to describe the offering, the only customization is the price that American Express will pay for the [Tariff 12] package," US Sprint said in its filing. Any offering that is bundled in such a way as to be available to only one customer for a special price is "totally inconsistent with a system of tariff service," US Sprint said.

Opponents said if AT&T were offering special services in its Tariff 12 plans, it could justify special pricing arrangements as well. But MCI and others claimed the Tariff 12 offerings are just packages of existing services from other tariffs.

By bundling preexisting services into a less expensive package for specific customers, AT&T has violated provisions of the Communications Act of 1934 that prohibit discrimination in the provision of telephone service, Puerto Rico Telephone said.

IDCMA raised concerns that noncarrier systems integrators are being disadvantaged by the Tariff 12 filings. Since AT&T is freed from tariffs in designing Tariff 12 deals, the association said systems integrators are being prevented from making competitive offers, which would result in the most cost-effective system for the user.

IDCMA recommended that AT&T be required to outline Tariff 12 pricing discounts in public tariffs. "IDCMA does not oppose appropriate customer discounts, [but] it does believe that such discounts should be made available pursuant to objective standards published in tariffs," according to its petition.

As an example of the type of pricing discrimination possible under Tariff 12 plans, IDCMA pointed to the pricing of AT&T's Accunet T-1.5 service. Under general tariff rates, a T-1 link from New York to Phoenix, including access charges, would be \$37,883.70. American Express, however, will pay \$23,852.25, a 33% discount, for the same service under the Tariff 12 plan, according to IDCMA. □

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ISDN: Revolutionary or Redundant?

**October 21, 1988
11:30 a.m. - 4:30 p.m. EST**

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Moderator: Bruce Hoard, Director Network World
Enterprise Division

Panelists include:

Irwin Dorros

One of the most respected technical voices in the communications community, Dorros is currently Executive Vice President, Technical Services for Bell Communications Research (Bellcore) in Livingston, New Jersey.

Howard Anderson

Howard Anderson is managing director of the Yankee Group, a Boston-based information-industry market research and consulting firm.

Jim Mathieu

One of the ISDN users, Mathieu is supervisor for telecommunications planning with Lockheed Missiles and Space in Sunnyvale, California.

Richard K. Snelling

Richard Snelling is Executive Vice President with Southern Bell Telephone and Telegraph.

John Kauza

John Kauza is Product Manager, ISDN Services, with AT&T.

Scott Augerson

Scott Augerson is Group Product Manager, Systems and Networks, with Siemens Information Systems.

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IBM boosts LAN control

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tions that request adapter, bridge and network status information and take action such as removing an adapter from the network.

Version 2.0 also provides for so called critical network resources, Cohen said. "The critical resource monitoring facility enables selected devices on the network to be defined," she said. "The LAN Manager then monitors these devices and sends an alert when and if the device becomes unavailable."

LAN Manager Version 2.0 can be used to manage mixed Token-Ring and broadband PC Networks that are linked by IBM's new PC Bridge Program. Version 2.0 uses the Communications Manager function of OS/2 Extended Edition Version 1.1 to exchange alert commands and information with NetView Release 3.

The earlier version of IBM LAN Manager provided only a service point function, according to David Passmore, a principal at Network Strategies, Inc., an end-user consulting firm in Fairfax, Va. This meant the LAN Manager had to convert local network alarms and alerts to Systems Network Architecture message formats before they could be sent to NetView on the mainframe.

According to Rick Villars, senior analyst for local-area networks at International Data Corp. in Framingham, Mass., Versions 1.0 and 2.0 of the IBM LAN Manager will be among the first products on the market to take advantage of the multitasking capabilities of the forthcoming OS/2

Extended Edition.

"The key issue among the users we've spoken with is the ability to have an integrated network management system. And until now, LAN Manager didn't provide a direct connection to NetView, the host-based network management system," Villars said.

Versions 2.0 and 1.0 make it easier for users to tie Token-Ring Networks into the corporate net management system, he said.

PC Bridge Program

The new PC Bridge Program extends the host-attachment capability of Token-Rings to broadband PC Networks. It enables devices attached to PC Networks to communicate with Token-Ring-attached hosts via the bridge.

The PC Bridge Program gives users with installed PC Networks the ability "to incorporate those networks into the companywide network, instead of leaving them out in the cold," Network Strategies' Passmore said. "And it protects their investment if they already have a PC Net."

Passmore and other industry analysts viewed the PC Bridge Program as a logical migration aid from broadband to baseband.

Both Versions 2.0 and 1.0 of the IBM LAN Manager are slated to ship in March 1989. Version 2.0 costs \$2,995 for first-time users, while those wishing to purchase an upgrade for the earlier version LAN Manager will pay \$1,250 through Dec. 31, 1989. Version 1.0 has a list price of \$995, and upgrades cost \$250.

The PC Network Bridge Program is scheduled to be available next April. It is priced at \$4,995. □

Hughes buys into satellites

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scheduled for launch in 1991.

Currently, Hughes Communications can provide users with a VSAT net package that includes VSAT equipment from Hughes Network Systems, Inc. and management and support services, said Eddy Hartenstein, vice-president of the network services unit of Hughes Communications. Now transponder space will be added to that package, he said.

Up until a year ago, when Hughes Communications acquired M/A-Com, Inc.'s VSAT and packet-switching operations, its business focused primarily on C-band satellite services. Hughes Communications uses its C-band satellites mostly for the distribution of radio and cable television broadcasts and, to a lesser extent, for data networks.

The company owns three C-band satellites in its Galaxy system and hopes to buy four Westar satellites from Western Union Corp. in a pending deal.

"This looks like a good deal for Hughes," said Ben Occhiogrosso, a vice-president at DVI Communications, Inc., a telecommunications consulting firm in New York. "Hughes will be able to market its services with more creative pricing strategies, but it assumes no assets."

VSATs have not been as popular a private net technology as original projections forecast, Occhiogrosso said. This is partly because the price was too high, often because of hidden costs, such as the acquisition of rights to install a VSAT on a roof, he said.

"But prices have dropped and the technology has matured," he said. "There is greater acceptance of VSATs now."

The May fire at Illinois Bell Telephone Co.'s central office in Hinsdale, Ill., which disrupted many users' networks, has helped the VSAT business by prompting many users to seek alternatives to the traditional public network, Occhiogrosso said, adding, "It will take more events like that to convince many users to use VSATs." □

Calendar

Oct. 2-5, Washington, D.C. — Retail Information Systems Conference. Contact: Conference Registrar, National Retail Merchants Association, 100 West 31st St., New York, N.Y. 10001.

Oct. 2-5, Phoenix, Ariz. — Honeywell Bull Users Meeting. Contact: NAHU/HLSUA, P.O. Box 41977, Rochester, N.Y. 14604.

Oct. 3, Santa Clara, Calif. — OS/2 and the Connectivity Promise. Contact: Paula Zinck, International Data Corp., 5 Speen St., Framingham, Mass. 01701.

Oct. 4-7, Boca Raton, Fla. — Competitive Telecommunications Association Conference: Pathways to Performance. Contact: National Telecommunications Network, 1350 Picard Drive, Rockville, Md. 20850.

Oct. 12-14, New York — CMA's 40th Conference: Telecommunications: Providing the Information Highway. Contact: Communications Managers Association, 40 Morristown Road, Bernardsville, N.J. 07924.

Oct. 16-19, Dallas — ADAPSO's 69th Management Conference. Contact: ADAPSO, Suite 300, 1300 N. 17th St., Arlington, Va. 22209.

Oct. 17-21, Myrtle Beach, S.C. — 10th Annual National Conference on Network Management. Contact: Applied Computing Devices, Inc., Aleph Park, 100 N. Campus Drive, Terre Haute, Ind. 47802.

Oct. 24-27, Dallas — Rockwell International Corp.'s 16th Annual Telecommunications Transmission Symposium. Contact: Rockwell International, Rockwell Communications Systems, P.O. Box 568842, Dallas, Texas 75356.

Oct. 25-27, Cambridge, Mass. — The Sixth Annual Seybold Executive Forum. Contact: Patricia Seybold's Office Computing Group, Suite 612, 148 State St., Boston, Mass. 02109.

Oct. 31-Nov. 2, New York — Unix Expo. Contact: National Expositions Company, Inc., 15 W. 39th St., New York, N.Y. 10018.

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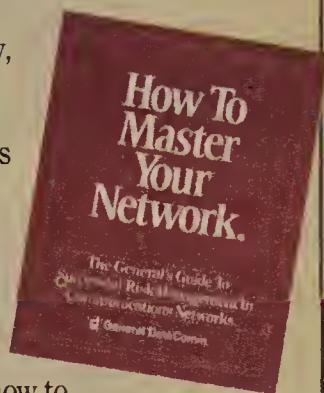
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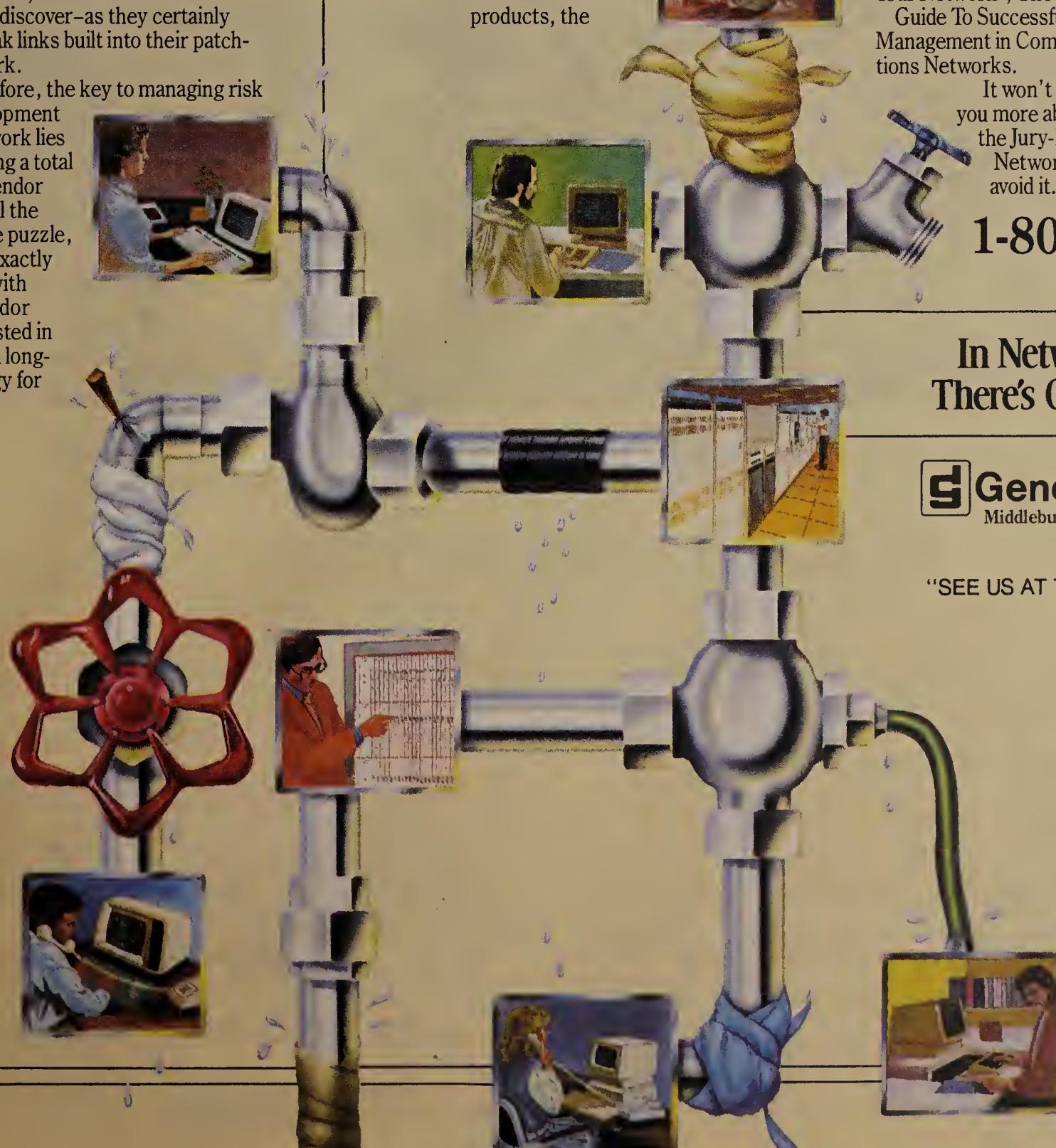


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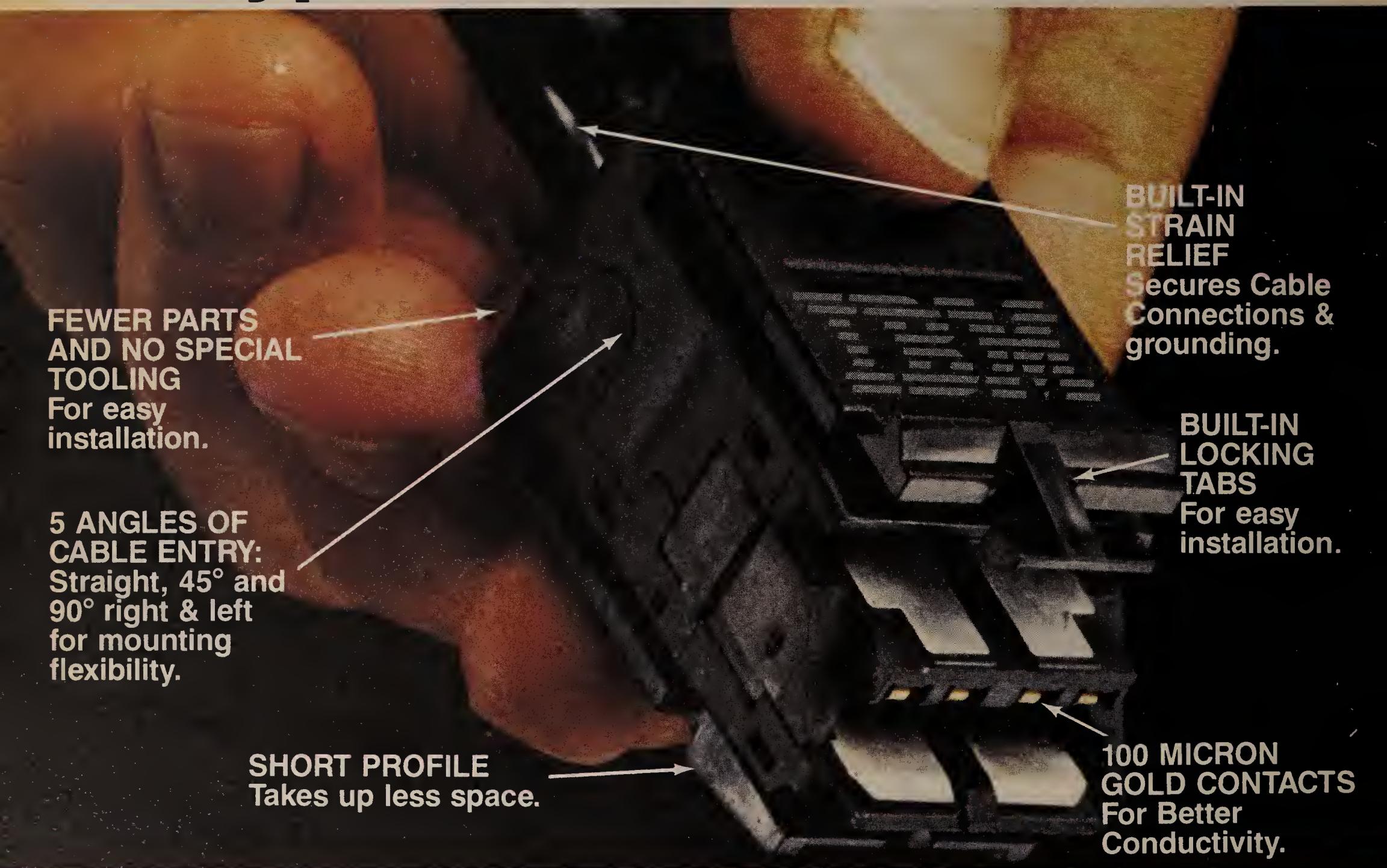
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